

October 1931

# TECHNOLOGY REVIEW



# technology review

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## THE TABULAR VIEW

IT would be difficult to find anyone more suited to the presentation of "New Lamps For Old" than Dr. ARTHUR D. LITTLE, for his name is closely allied with every phase of chemical engineering and with industrial progress. In this article he brings out the difficulties encountered in presenting new ideas for the advancement of progress, citing many instances from the past of men who have suffered at the hands of those who cannot (as he puts it) "see the oak in the acorn." ¶ To Dr. Little's list of "rejections" many more instances might be added. Simpson, the great surgeon who ushered in chloroform as an anaesthetic, could see no merit in Lister's advocacy of antiseptic treatment. Jenner met with reproof and rebuke when trying to convince his colleagues of the importance of vaccination. One of Joule's most important papers was refused publication by the Royal Society, and the mathematician, Poisson, once described as unintelligible a paper by Galois on the theory of groups — the paper that presented one of the great mathematical achievements of the Nineteenth Century. But progress continues in spite of the opposition of authority and, it seems meet to add, in spite of the dangers often accompanying laboratory experimentation. There are many instances, few of which are known to the general public, where men of science have risked their lives to test the theories upon which they are working. In London six medical men allowed themselves to be subjected to cancer experiments to test a theory of the cause and development of this disease, and many have given their lives to the cause of radium and the development of the use of x-rays. ¶ Dr. Little is a man of ideas as well as action, and has evolved from his work a definite philosophy — a kind of chemical philosophy, if you will — but all the more interesting for its uniqueness. And A. D. Little, Inc. (dedicated to industrial progress), is a definite embodiment of his philosophic principles of chemistry, and ample proof of his theory that research serves "to make building stones out of stumbling blocks." His ability to relate chemistry to everything about him has made him as well known among bankers and in business circles as among chemists. In an address before the Annual Convention of New York State Bankers in 1923 on "The Chemistry Behind the Dollar," he shows how chemical laboratories are the prime movers for the machinery of civilization. "I doubt if a corporation is listed on the New York Stock Exchange that doesn't in some phase of its activities touch chemistry." On another occasion, he pointed out the importance of science and invention as creators of jobs (a point not generally taken into consideration by critics of the machine age, as President Compton has frequently remarked). ¶ Dr. Little, a member of the class of 1885 at the Institute, was given an honorary doctor's degree last June by Columbia University. He has been President of the M. I. T. Alumni Association; he was the guiding spirit in founding the M. I. T. Chemical Engineering Practice Schools; and he is a Life Mem-

(Concluded on page 4)

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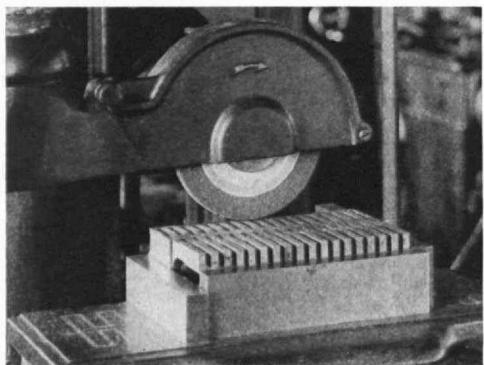
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## THE TABULAR VIEW

(Concluded from page 2)

ber of the Corporation. Many honors have come to Dr. Little. He has been President of the American Chemical Society, the American Institute of Chemical Engineers, and the Society of Chemical Industry of Great Britain (a position previously held by only four Americans, and a recognition of the highest attainment in chemical engineering). Last January he received from the Society of Chemical Industry the highest honor it bestows, the Sir William Perkin medal, for outstanding accomplishment in the realm of chemistry.

THIS might well be considered the Age of Criticism; that is, criticism in the literary sense as a constructive analysis of things as they are. A little of the scientific spirit of getting to the heart of things has appeared in every thoughtful person, with the result that we find many interpretations and analytical appreciations of the world we live in today. "Slide Rule Civilization," by the Honorable RAY LYMAN WILBUR, Secretary of the Interior, is such a criticism; it is the interpretation of our standard of living from the point of view of an educator and a statesman. He believes our civilization is founded on the use of facts, compiled from our education and enlarged by our experience, and the expert is the man who can arrange these facts to render practical service to the community and to the nation. This paper was first presented to the members of the 1931 graduating class of M. I. T. A member of President Hoover's cabinet (we suppose everyone knows this!), Mr. Wilbur is also President of Stanford University.

DR. ALLAN WINTER ROWE, '01, has in the past contributed several articles on endocrinology to The Review, based on his experience as Chief of Research at the Evans Memorial. His thesis in "Chemistry's Next Service to Medicine" is that the chemist has much to contribute to the manufacture and synthesis of active principles and in the determination of the identity or similarity of certain hormones now drawn from widely different sources; in devising a means of standardization on which accurate dosages may be based; in eliminating active contaminants; and in making possible lower prices.

SINCE the article on rocket propulsion by J. RHYNE KILLIAN, JR., Editor of The Review, was written, an announcement has been made of a series of rocket experiments to be conducted by Dr. Darwino Lyon in the Lybian desert. ¶ J. F. BRANDT, who contributed the article on optical glass in the Trend of Affairs section, is affiliated with the Bausch and Lomb Optical Company of Rochester, N. Y. ¶ The cover picture of this issue was reproduced from a copyrighted photograph by Captain ALFRED G. BUCKHAM, one-time member of Britain's Royal Air Force, now plying his great gifts as a photographer in the United States. ¶ The cover photograph shows a scene near the Firth of Forth Bridge, Scotland.

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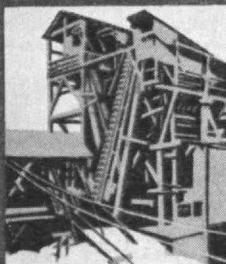
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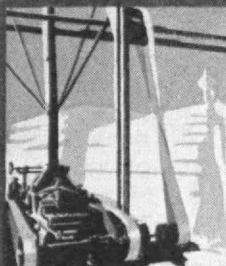
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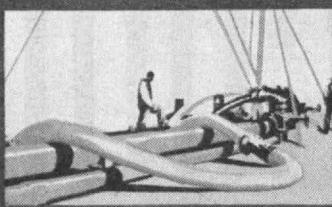
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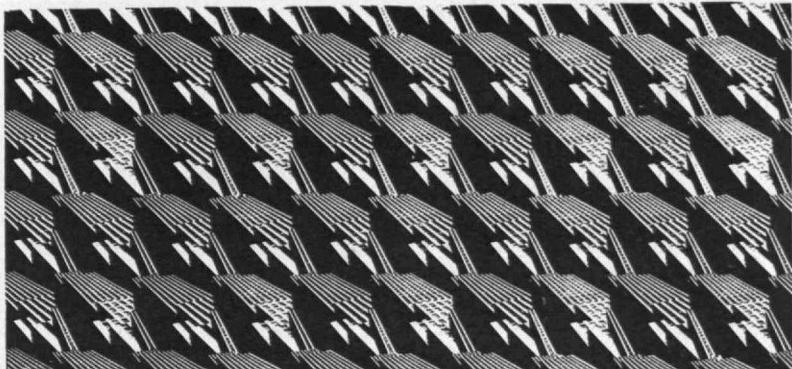
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# THE TECHNOLOGY REVIEW

A NATIONAL JOURNAL DEVOTED TO SCIENCE, ENGINEERING, AND THE PRACTICAL ARTS

*Edited at the Massachusetts Institute of Technology*

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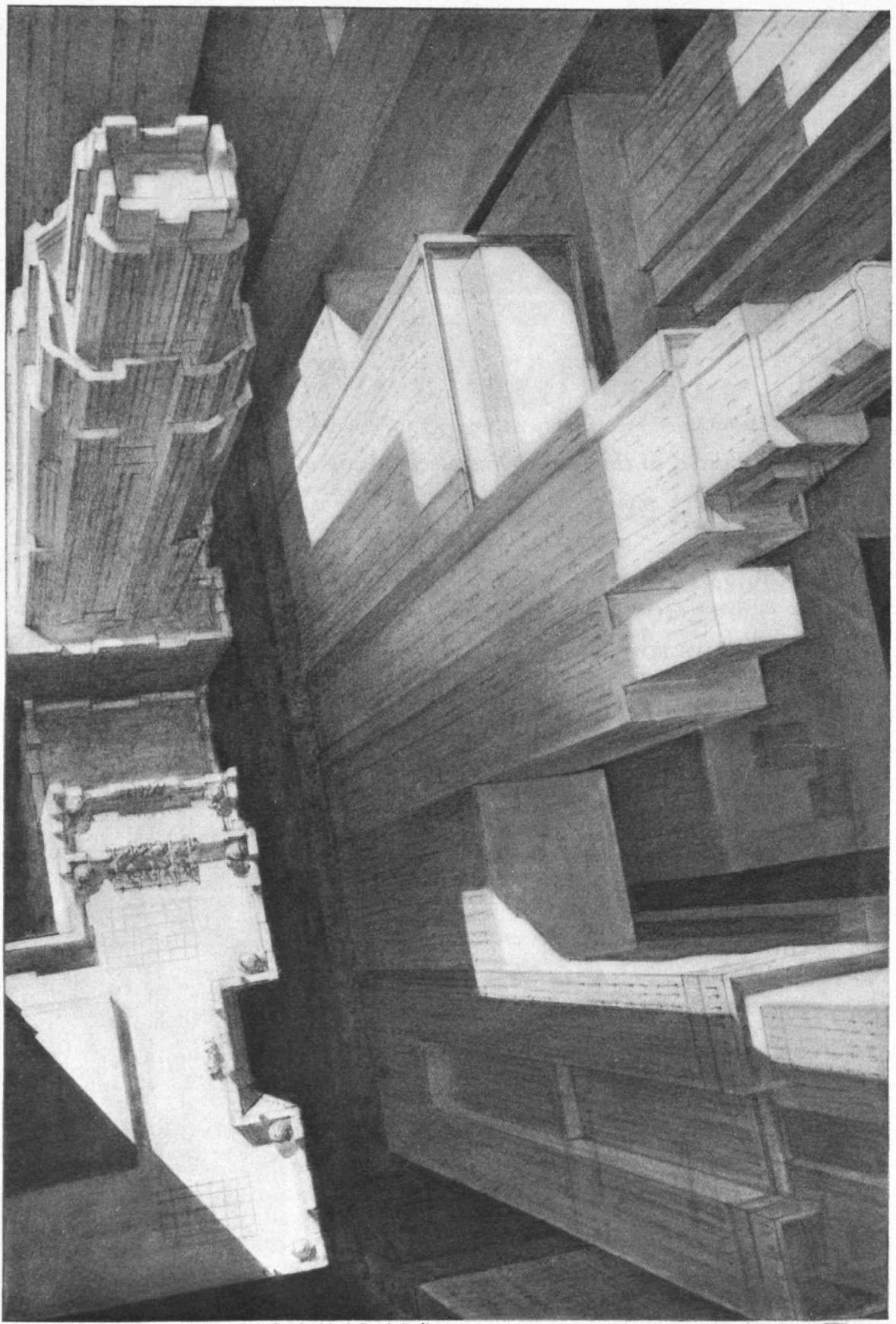
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*From a pencil and crayon drawing by Leopold de Postels of the de Postels Studio*

*Leopold de Postels*

*Imaginative Conception of a Modern American City as Looked at from Above*

# THE TECHNOLOGY REVIEW

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Vol. 34, No. 1



October, 1931

## NEW LAMPS FOR OLD

*There Is a Vested Interest in Outmoded Science*

BY ARTHUR D. LITTLE

**T**HREE are many incidents in the engaging story of Aladdin which taxed the credulity of our forefathers. Today we find science more resourceful than all his genii. We may no longer question Aladdin's palace when our own palatial skyscrapers rise almost overnight to heights beyond his topmost minarets. We do not begrudge him his 80 basins piled high with gems since we ourselves dig diamonds with steam shovels. His flight to Africa for the rescue of his princess was a brief excursion beside those of modern aviators.

The one thing which sticks in Aladdin's otherwise credible story is the easy way in which new lamps were exchanged for old. That is something opposed to all human experience. However dim the radiation from old lamps may be, their possessors cling to them with militant tenacity and are as resentful of the brighter illumination afforded by the new as the owl is of the sun at midday.

Every generation has its vendors of new lamps, and seldom has the exchange for old ones been accomplished until the vendor has given much to boot. There is a vested interest in old conceptions as there is in material things, and intruders are as unwelcome in the one case as in the other. There is no more difficult art than that of selling new ideas, and it is often as dangerous as it is difficult. Prometheus had some ideas about combustion, and the vulture still tears his liver. King Edward I dealt with such matters more considerately: he merely hung a man for burning coal.

Giordano Bruno, the great Italian astronomer of the Sixteenth Century, dared to teach the plurality of worlds and to insist in his "Evening Conversations" that the Scriptures were never intended to teach science, but morals only. He paid, at the stake, for his temerity and for his inflexible adherence to the truth after six years' imprisonment at Venice without paper, books, or friends, and two years in the dungeons of the Inquisition at Rome.

Galileo's ill-timed discovery that the earth moves around the sun cost him almost as dear. Thirty-two years after the death of Bruno he was arrested for the second time. Believing that the truth has no need of martyrs, the venerable man, who was, perhaps, the most illustrious of his time, saved his life by recantation upon his knees, only to spend his last ten years virtually a prisoner under conditions of remorseless severity. Fortunately, the world still moves.

There is a fundamentalism in science as in religion, and in both spheres of thought vision may be long obscured by smoke screens emanating from Authority. Aristotle was an astronomer without a telescope, a biologist without a microscope, a chemist without a laboratory, and yet for nearly two thousand years it was scientific heresy to question his conceptions of natural phenomena. Although his contributions to philosophy made an even more enduring impression upon human thought, his end was that of Socrates, though he drank his cup of hemlock voluntarily and in exile.

The fantastic theory by which Paracelsus explained the burning of wood was accepted for hundreds of years. Wood burned because it contained sulphur, it flamed because it contained mercury, and it left an ash because it contained salt. This idea was at last displaced by the equally fantastic phlogiston theory advanced in the Seventeenth Century by Becker, in whose person were united, perhaps for the first time, the chemist and the alchemist. Phlogiston was fire itself, a fatty, inflammable earth present in all substances which could burn. It had weight, and, since it escaped during the process of combustion, what remained weighed less than it had before.

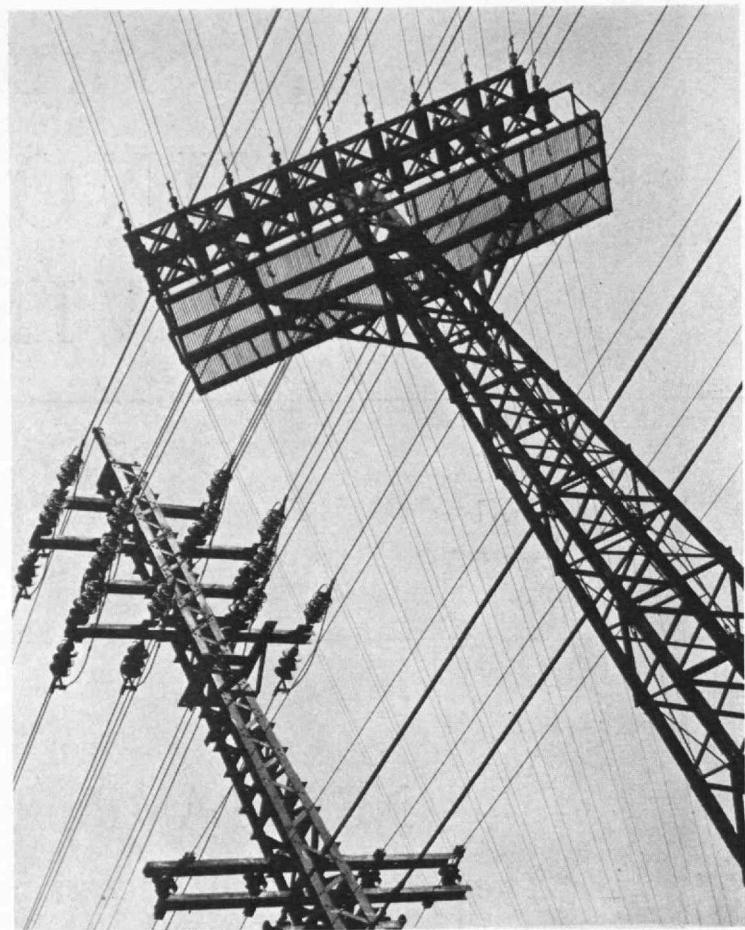
For a century phlogiston shackled the thought of such great minds as those of Priestley, the discoverer of oxygen; Scheele, the Swedish apothecary who discovered chlorine; and even that of Cavendish, the eccentric and enormously rich recluse who kept a million pounds untouched in the Bank of England, and who was the ablest and most persistent experimenter of his time.

It remained for Lavoisier, the Father of Chemistry, to perform in October, 1774, the classical experiment which led him to explain combustion in the terms we now accept; namely, as the union of oxygen and the burning substance. During the French Revolution, Marat, himself a chemist, though of a poor sort, denounced Lavoisier as the "master of charlatans, the putative father of all the discoveries that are noised about, who, having no ideas of his own, snatches at those of others, but having no ability to appreciate them, rapidly abandons them and changes his theories as he does his shoes."

There hangs in my office a picture entitled "The Arrest of Lavoisier." The great chemist, and one of the greatest men ever produced by France, stands in silent dignity as he listens to the reading of the warrant by an arrogant and vulgar fellow in a red cap, behind whom crowd the exulting rabble. The arrest was followed by the inevitable sentence of death from a judge who, in passing it, declared, "The Republic has no need of chemists."

Priestley, the discoverer of oxygen, and otherwise an inoffensive dissenting clergyman, struggling to support his family on insufficient means, was driven from his sacked and devastated home on July 14, 1791, the anniversary of the storming of the Bastille. It is difficult at this distance to trace the connection between the two events as it existed in the minds of the members

*"In reviewing the difficulties surrounding the exchange of new lamps for old, one is forced to the conclusion that Authority, if not indeed blind, like Justice, is at least myopic. With monotonous repetition the new has been rejected by those presumably best qualified to appraise its worth. Far too often has their decision been confirmed by ignorance and self-interest."*



Courtesy Irrington Varnish and Insulator Company

of the mob, but the clergy of the Established Church had inflamed the people against the Dissenters, and Priestley suffered the usual fate of those who would exchange new lamps for old. He later emigrated to America, where, at Northumberland, Pa., he died and was buried. One hundred years afterward the chemists of America gathered around his grave and there organized the American Chemical Society.

Chemistry now recognizes 92 elements, all of which have been discovered. With the advance of the science, many curious and suggestive relationships between these elements were noted. They seemed to present themselves in family groups in which the properties of the individual members were progressively modified. John Newlands, an Englishman, thereupon arranged a table of the elements in which each succeeding eighth element showed properties thus related to those of the first member in that particular series. He was laughed at. He was asked if he had ever arranged the elements in the order of their initial letters. Yet seven years later, in 1869, Mendeléyev, the Russian, disclosed to the world the periodic table of the elements which soon found general acceptance and led to the prediction and discovery of many elements previously unknown. To quote H. C. Bolton, "The Periodic Law has given to Chemistry that prophetic power long regarded as the peculiar dignity of the sister science, Astronomy."

The price of leadership in intellectual fields is billed in many coins, and the cost of leadership in science has, all too commonly, included destitution and derision.



Courtesy Lincoln Electric Company

It may be paid, as it was by Madame Curie, in aching years of poverty: years lived in a garret room on one-half franc a day, thinking long thoughts and carrying coal and water up five long flights of stairs.

Often the price has been the dogged courage which holds the leader to his course in spite of physical limitations and disabilities which might well crush another. Pasteur, midway in his career, was the victim of a paralytic stroke which would have broken a weaker spirit. Instead, it spurred him on to greater effort, which resulted in much of his best work. Mendeléyev had hardly passed his 20th year when the physician who examined his weak lungs gave him only six months to live. Undaunted, he lived on for more than 50 years, 20 of which he gave to the development of his monumental periodic table.

Arrhenius, like a viking of truth, battled for years to establish his theory of electrolytic dissociation. Avagadro, although ignored during a long lifetime by his fellow-chemists, was so serenely conscious of the truth of his great generalization that he continued to teach his students that "equal volumes of all gases under the same conditions of temperature and pressure contain the same number of molecules."

In 1876 J. Willard Gibbs buried in the Transactions of the Connecticut Academy a paper with the formidable title, "On the Equilibrium of Heterogeneous Substances." It took the world 30 years to discover that "he had founded a new department of chemical

science comparable in importance to that created by Lavoisier."

When stereochemistry was born with the publication of Van't Hoff's "Chemistry in Space," its author met with imperturbable good nature the storm of ridicule and sarcasm which his views aroused. Kolbe, a contemporary of ponderous authority, found stereochemistry as dangerous and pernicious as the belief in witchcraft. He characterized it as absurd and unintelligible, the product of hallucinations presented with astounding assurance and audacity. To further relieve his mind he wrote: "A certain Dr. J. H. Van't Hoff of the Veterinary College, Utrecht, appears to have no taste for exact chemical research. He finds it a less arduous task to mount his Pegasus (evidently borrowed from the Veterinary College) and to soar to his Chemical Parnassus, there to reveal in his '*La Chimie dans l'Espace*' how he finds the atoms situated in the world's space." Van't Hoff was not disturbed. "He photographed the most decrepit horse to be found in the veterinary stables, labelled it Pegasus and hung it on the walls of the University of Utrecht."

**G**ENTLENESS, transparent honesty, and love of truth were conspicuous elements in the character of Charles Darwin, yet few men have been the exciting cause of more violent controversy. It has ranged from Bishop Wilberforce to Mr. Bryan, from Oxford to Tennessee. "The Origin of Species," which raised the storm which has not yet wholly abated, was published in 1859. It was the Herculean effort of a man of whom his son wrote: "For nearly forty years he never knew one day of the health of ordinary men and his life was thus one long struggle against the weariness and strain of sickness."

There is a noble army of martyrs to that insistent urge which drives men to face the perils of the Unknown, and they have met their death in all the lands and seas between the resting place of Sir John Franklin and that heap of snow which covered Scott. Magellan, who first circumnavigated the globe, was killed in an unnecessary battle with natives in the Philippines. Captain Cook, the greatest of British maritime discoverers, met a similar fate on the Island of Hawaii. Even Columbus was returned to Spain in chains from Hispaniola.

Marco Polo, the greatest, probably the most accurate, and certainly the most interesting of mediaeval travelers, returned to Venice from his amazing journey across

"The price of leadership in intellectual fields is bled in many coins, and the cost of leadership in science has, all too commonly, included destitution and derision. It may be paid, as it was by Madame Curie, in aching years of poverty: years lived in a garret room on one-half franc a day, thinking long thoughts and carrying coal and water up five long flights of stairs."



Photo Eugene Hutchinson



Courtesy The Colorado Fuel and Iron Company

the deserts of Persia, the heights of Pamir and Tibet to the dazzling court of the Great Khan and the marvels of Cathay, only to meet with incredulity and to acquire the insulting sobriquet, "*Marco millioni*," Marco of the Millions. His story, which has since been verified in most of its details, was incredible. Who could believe in such things as paper money, printed books, black stones which burned, and nuts as large as a man's head? Who could have traveled so many miles, seen such monstrous armies, such temples and such palaces? For many years after his return every carnival of Venice was enlivened by the preposterous antics of a clown who impersonated *Marco millioni*. Even today, in England, "It's a Marco Polo" is school-boy slang for Roosevelt's "shorter and uglier word."

In 1807 Lewis and Clark, in our own country, met with much the same reception upon their return from their exploration of what is now Yellowstone Park. Even a fisherman could not be expected to believe that without moving his position he could catch a trout in icy water and toss him, still on the hook, into a boiling spring for cooking. Who ever heard of a mountain of glass outside a fairy tale; or, even in a fairy tale, of such an absurdity as intermittent fountains of boiling water which operated with the regularity of clockwork? The wonders and the incredulity grew with the reports of returning prospectors until, in 1869, an expedition was organized for the express purpose of verifying or refuting such provocative travelers' tales.

**W**E ARE now living, though not without some protest, in what we call The Machine Age, and our civilization is largely based on coal and oil. Such foundation was not established nor was the machine developed without passionate resistance from Authority, ignorance, and vested interests.

Through the long course of centuries and down to relatively recent times, wood was practically the only fuel used. Charcoal followed naturally as a derivative of wood. In the days of King Edward I, it was, as I have

already said, a capital offense to burn coal in London. The criminality slowly diminished in degree, but in 1550 Queen Elizabeth prohibited the burning of coal in London during the Parliamentary season for fear that "the health of the Knights of the Shire might suffer during their abode in the Metropolis." One hundred and fifty years ago it was as iniquitous and perhaps more dangerous to sell coal in Philadelphia than to sell liquor there today.

In 1619 the growing scarcity of wood in England led Dudley to attempt the substitution of coal for charcoal in his blast furnace. The iron masters drove him out of Worcester County. He set up another furnace at Hasco-bridge. A riot was organized and the furnace wrecked, with the result that a commercially successful demonstration was delayed until 1756 when it contributed its share to the forces behind the Industrial Revolution.

Our gigantic petroleum industry, with its hundreds of thousands of wells, its vast storage reservoirs, its pipe lines rivaling railway systems in length, its tank farms like strangely ordered villages, its huge refineries, and ubiquitous agencies for distribution, has profoundly affected our whole social and economic structure. It has put the world on wheels and made motor cars commoner than telephones. It has enabled man to follow the way of the eagle in the air, it is changing the way of the ship in the midst of the sea, and it has not been without its influence upon the way of a man with a maid.

The industry, like so many others that have conferred great benefits upon mankind, came into being because a man had faith in an idea at which his neighbors scoffed. Edwin L. Drake, of Titusville, Pa., believed that great quantities of petroleum existed in subterranean cavities and could be reached by sinking wells. In the spring of 1859 he started digging, but soon struck rock, which so impeded progress that he abandoned pick and shovel for an iron drill and drove down an iron pipe as the drill advanced. His effort became the laughing-stock of all western Pennsylvania, but when his well reached a depth of  $69\frac{1}{2}$  feet and filled (*Continued on page 36*)



*Bas-reliefs by A. Bottiau in*

THE educational process is really on its way with an individual when he realizes that two times two always makes four and never three or five. Our civilization is based upon the use of facts. Through the ages man has advanced slowly from the period of magic and hocus pocus. There is still left a residue of magic in nearly all of us and in many parts of the world, and since these are the least advanced, it weighs heavier than fact. The will to believe probably still controls a majority of the inhabitants on this earth of ours, but in such a country as this, magic has been largely replaced by mathematics. The expert in facts, and the man who can arrange these facts in such a way that they render practical service, is the true guide of the material side of civilization.

As I have watched a modern building grow into the sky, I have often wished that I might have been in the offing when one of the great Egyptian obelisks was raised. Some one at that time had to make the plans that we call blueprints today, assemble the material, organize the slave labor, and bring the great mass of stone to an erect position. No doubt there was much in the way of incantation, and much mystery developed in the minds of some of those who saw the obelisk reach its final resting place. As a product of civilization, it seems very simple compared to the great buildings of today, and yet with the information available to the men of that day, it no doubt represented the acme of human achievement.

We have become accustomed to miracles. Our adaptation of apparatus so that it will orient and control the forces of nature has become so extensive that it is commonplace. We can hardly think of any one of our modern machines that would not have been a source of destruction to its inventor or owner in the days of witchcraft. We have assembled a great mass of information, great libraries of facts, and have trained men in their use to such a degree that the unusual has become

# SLIDE RULE CIVILIZATION

## *The Engineering Mind as an Aid to Progress*

BY RAY LYMAN WILBUR

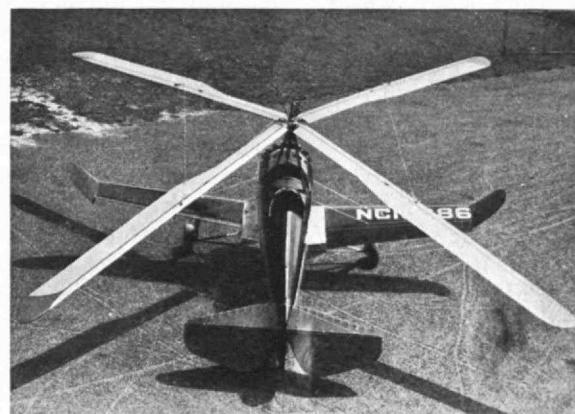


*Integrity Trust Co., Philadelphia*

ordinary. A great iron ship steered by machinery, guided by the compass and radio, starts off across the trackless ocean without even a thought on our part as to the culmination of the successive activities which it represents. The slide rule and what it typifies is building our civilization and controlling much of our education. It stands for accurate computation and for orderly, dependable facts. We rely upon it and upon those who work with it with an abandon akin to recklessness. A moment's contemplation would show us how much we depend every day upon the accuracy of its findings. We seem firmly based on reality.

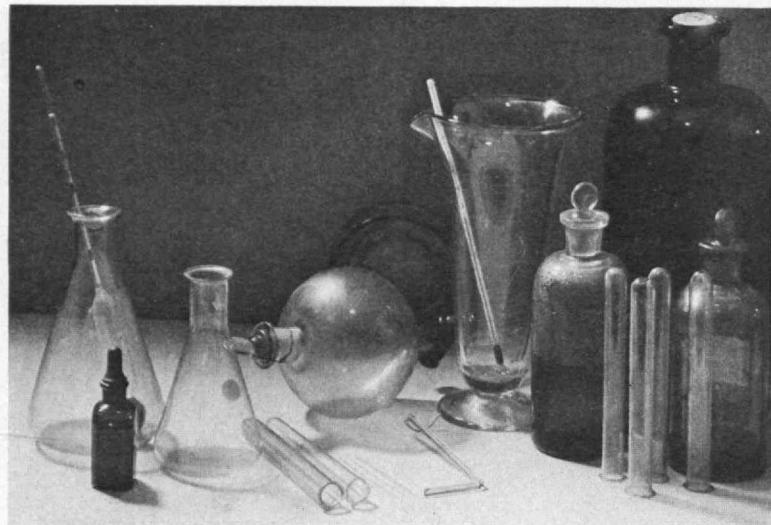
THE greatest problem, though, in our civilization and in our democratic form of government is that uncertain biological unit known as man. No one can foresee what the possibilities of any given individual may be. Man is the innovator, the self-starter. His caprice, his will, his curiosity, or his appetites stimulate him to action. His mind is full of imaginings, hopes, and aspirations. As he discovers that he has a mind, he senses also its capacity to grow in power with use. While most men are to a considerable degree controlled by traditions and social customs, a chosen few, and these are largely self-chosen, start out in various directions to find new things or new ways of doing old things. If they accept the discipline of the slide rule, they become civilization's new builders.

Our mental pictures, dreams, and speculations need to be brought under control, put in order, and put to work. It is a marvelous thing to see the surety with which the trained scientist walks among the powerful unseen forces about us. Man, the conqueror of lightning, has tied it in to mechanical creations which spread their useful tentacles through our whole society. Yet they are ever ready to slay us if we violate the rules of an established game. The dependability of



*Ewing Galloway*

Chemical Glass



Chas. R. Phipps

the laws upon which these unseen forces act is so secure that they are accepted without questioning. By piling discovery upon discovery and by putting various forces to work, we have created a host of effective servants to replace the muscles of men.

The greatest joy in work is the search for a universal truth, to discover something new, to find some new force, and to put it to use. There are many who cannot understand the meaning of a slide rule civilization, particularly when it is projected into the field of the care of the human body or the treatment of disease, or when it interferes in any way with certain conceptions regarding the freedom of the individual or human liberty.

Critics of the scientific method are common, but I have noticed that no untrained critic elects to be placed in the central switch room of a powerful circuit with instructions to play with the switches just as he pleases. To understand these forces of nature is to respect them.

One of the difficulties in our fact-handling is to take into account all of the facts that are important and exercise due caution in coming to final conclusions. Thirty odd years ago, when I was in Arizona on a collecting trip for birds and animals, we were asked to find out whether the Gila monster, prevalent in that region, was considered poisonous by the residents. There was wide diversity of opinion. I asked the question of an established settler of Indian extraction who said that he did not know whether they were poisonous or not, but that an Army captain and another man got into an argument on this very point some time before, which resulted in a wager of a hundred dollars. The captain then permitted a Gila monster in captivity to bite him. The Indian's comment was: "All I know is that I helped bury him next day. Some says they are pizen and some says they isn't."

Facts have their own way of uncovering themselves. They must be met square on. To attempt to evade them is a common sport. The disciples of the slide rule learn to assemble and to face them. But even in handling facts and figures our emotional make-up leads to unevenness because of different emphasis. Apparently the safest way to meet them is to follow the admonition of the old darkey who said, "When I has anything to say to a mule I sez it to his face."

Our country is classified as a capitalistic nation. It is unfortunate that the name "capital" has been so widely accepted, since it was given by antagonistic theorists who had specified formulae for community living. Capital represents the savings of civilization. It is a pooling of the resources built up by man as a seed-planting and saving animal. We commend the ants and the honeybees for storing up that capital which will carry them over through the seasons of little food and assure their reproduction. We should likewise commend ourselves for our capacity to live in all parts of the temperate and even in the arctic zone through artificial protection of ourselves from the climate and by proper storage of food and other supplies. Our wealth is represented by our savings. To this we have added the great natural wealth of our continent in water, trees, minerals, coal, oil, and gas, and also the new sources of power or wealth that have come to us out of the laboratory.

Slide rule civilization has given us organization and distribution of our various forms of wealth to such a degree as has never been known before. Just as the constructor must have blueprints and raise scaffolding, then build from story to story, so must we in our civilization build in accordance with plans and have our foundations firm and dependable. We are now undergoing an economic illness which an old doctor might classify as a congestive chill following a plethoric condition. It looks now as though we were in a state of convalescence, reaching out for some one to help us get back on both feet and at the job again. There are factors in this that go beyond our present powers of accurate measurement and definite diagnosis. Mass psychology pervades our joint actions. The speed of transporting men and goods to all parts of a world unified and made smaller thereby is confusing to our economists and psychologists. Such forces never acted so widely, so vigorously, and so promptly before. Instead of a regional economic illness we have been sick all over. But the constitution built for civilization by science, acting through agriculture and industry, is a good one. It retains its fundamental capacities to support us as well as to permit further growth. It needs the same scrutinizing research in psychology, economics, and (Continued on page 42)

# ENDOCRINE THERAPY

## *And Chemistry's Next Service to Medicine*

BY ALLAN W. ROWE

THE endocrine glands constitute a group of highly differentiated and specialized tissues all of which are important and some essential to life. In the metabolic processes of the cells which compose them, products are formed which pass directly into the blood stream, and by this medium they are carried and distributed throughout the entire body mechanism. They serve, and in no small measure control, such fundamentally important functions as the regulation of development, growth, nutrition, reproduction, and similar basic attributes of the living organism.

With their powerful influence on the basic functions of protoplasm, any abnormal secretory activity of the individual gland leads to an abnormal expression of those functions over which it exercises a regulating power. Results such as gigantism, dwarfism, extreme obesity and emaciation, infertility, marked changes in mentality, in the secondary characteristics of sex, and a wide variety of other striking manifestations are thus produced.

True over-production has been demonstrated with certainty in but a few of the group and this less frequently than the opposite condition of under-production which is common to them all. The possibility of spontaneous functional involution, recognized in the pituitary and thyroid, leads to intermediate and mixed conditions where an initial and transitory overactivity is merging to a terminal and permanent glandular failure. Control of hyper-function, depending upon the gland involved, may be secured through surgery, through radiology, and, incompletely in a few isolated instances, through drug therapy.

Experience has shown that the same glands as found in other animal species produce the same or similar active principles. As a logical corollary to this observation it has followed that in the far more frequently encountered condition of depressed glandular activity the administration of such material drawn from animal sources other than man offers an effective basis for replacement therapy. In the initial plan of development of this form of treatment the fresh or desiccated gland itself was administered orally or by injection. An older generation will remember the startling announcement of Brown Sequard. While his individual claims to the production of significant physiologic change have completely failed of substantiation, the general principle as

applied to established endocrine tissues has laid the foundation for a highly effective ootherapy. Even today this is giving relatively complete palliation in a long list of serious and, in part at least, fatal endocrine disorders.

As the active principles constitute but a very small part of the individual glandular mass, investigation early turned to means of freeing these active agents or hormones from the large amount of inert or even deleterious material with which they were associated. Such extracts were, of course, far more potent, less likely to produce untoward reactions, and, in the main, easier of administration. All of these factors are highly important, the last peculiarly so from the standpoint of the patient, as the individual presenting a glandular failure capable of relief by replacement therapy is constrained to continue the use of the material throughout the remaining life span.

The problem of the isolation of active extracts has been by no means a simple one. Some of the compounds, at least, are highly labile bodies and may be destroyed during the processes of extraction by the chemical agents used or even by other materials produced in other portions of the same gland from which they are derived.

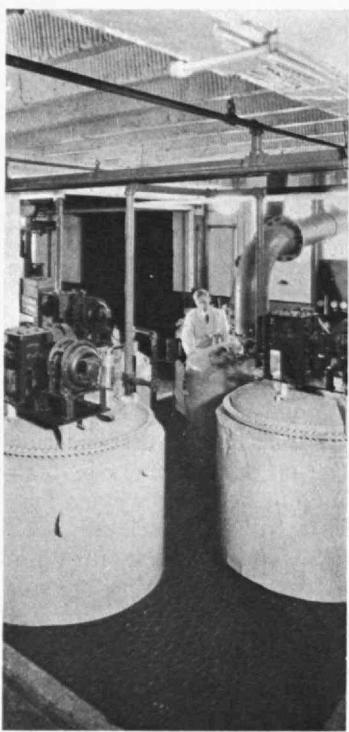
That insulin, the active material from the islands of Langerhans, a part of the pancreas, is destroyed by the digestive enzymes produced by other cells of the same gland is a well-known illustration of this latter condition. In spite of the many years of investigation, both in numerous American and foreign laboratories, it is only within the last eighteen months that two independent investigators have produced active material from an essential organ, the adrenal cortex, which will maintain life indefinitely in animals from which the glands have been ablated.

BROADLY speaking, the common, initial step is some form of extraction, but the solvent medium varies widely with the gland involved. In the first group, that of neutral solvents, water or weak neutral salt solution will extract active material from the posterior pituitary, a glandular structure containing substances producing several well-differentiated, physiological effects. Simple organic solvents such as alcohol, ether, benzene and acetone are used for the primary extraction of the adrenal cortex, the follicular and corpus luteum

*By placing in the hands of the physician adequate amounts of pure, standardized, chemical entities (such as glandular extracts) of established quantitative, physiological activity at reasonable cost, the chemists and chemical engineers can produce an enormous alleviation of human suffering, prolong life, and maintain physical efficiency.*

*There are today not less than 15 active principles, the efficacy of which has been proved but the chemical nature of which is entirely obscure. The synthesis of these will resolve the question of identity, permit the determination and administration of accurate dosages, eliminate contaminants, and lower or stabilize the price.*

*The preparation of active extracts has been the work of biochemistry. Both chemistry and engineering must combine if the present major problems are to be solved.*



*Eli Lilly and Company*  
Storage tanks and still used in production of Liver Extract

terior pituitary not soluble in salt solution, while dilute alkali removes a group of active substances from the anterior lobe of the pituitary. Acid alcohol treatment is the basis of the present extraction of the pancreatic hormone, insulin.

In the third and final group more drastic procedures are found to be essential, and either protracted acid or alkali hydrolysis at raised temperatures are necessary to liberate the active materials. The first yields the hormone from the parathyroid, the second, an active principle, thyroxin, from the thyroid gland.

The initial extraction is but a preliminary to a series of operations, each of which yields purer material until the product of the last stadium is suitable for therapeutic use. Extractions with various solvents, evaporation — usually at reduced pressure and temperature — and precipitations, either iso-electric or with combining substances are the features of the purifying techniques.

In addition to the endocrine glands mentioned above, recent research has demonstrated that other tissues, such as the placenta, may originate or store active

portions of the essential sex glands of the female and, most recently, the complementary structure in the male. This latter group of substances are either lipoids or are associated with them, the characteristic solubilities determining the solvent selected.

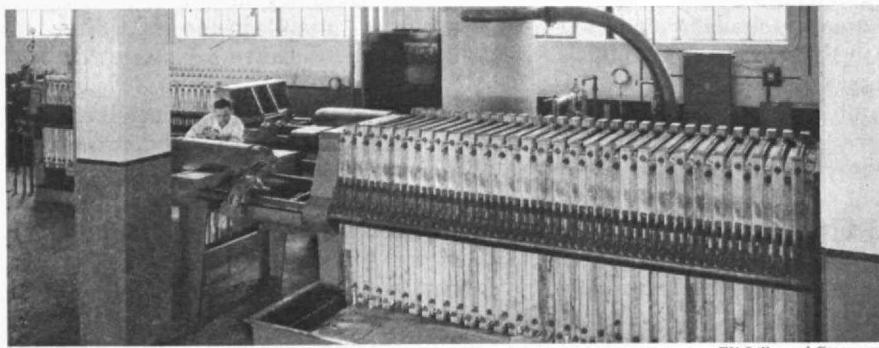
A second group of solvents are those in which, seemingly, chemical reaction takes place between the active substance and a portion of the solvent, the resulting compound being dissolved in the menstruum. Acid extraction is used with the adrenal medulla and to secure other material from the pos-

principles and that certain hormones under special conditions can be isolated in appreciable quantities from body wastes, primarily those excreted by the kidneys. Several of these latter demonstrate physiological activities similar to hormones from individual glandular sources and are assumed by many to be identical with them. This is, however, purely assumptive, and the more conservative practice, followed by a few, of designating them as "like" is to be recommended.

A second major problem lies in the standardization of these various active principles so that the dose administered may be estimated with some degree of precision. Existing in the organism, as they do, in very small quantities and in these concentrations capable of producing profound physiological response, it is absolutely essential that means must be devised to assay their potency. Even today, many preparations are given on the basis of so many grains of the fresh or dried substance without any index of the real content of active material. In but a very few instances, to be touched on later, these materials are not known as chemical entities existing in a pure state but as substances of unknown composition held in solution or suspension in some liquid medium and associated with appreciable amounts of impurities which in themselves may be physiologically active. With such materials, chemical methods are demonstrably inadequate. The U. S. P. designates the thyroid standard (whole gland either fresh or desiccated) as based on the iodine content, this element being a constituent of thyroxin, a probable active substance in the gland. It is known, however, that all of the iodine in the gland is not contained in this compound and in compounding it would be very easy to sophisticate the finished product by adding some simple mineral iodide, yielding, on assay, an implication of therapeutic potency wholly misleading. Such a criterion is as little informative as would be the assay of digitalis, a natural mixture of glucosides of widely varying toxicity, on the basis of the glucose content.

Biological methods are far superior to chemical in the present status of the problem, but they are usually crude and in many ways unsatisfactory. They do serve, however, to indicate the presence of active material even though the procedure is indirect and scarcely more than qualitative. This is highly important as it lessens the probability of the administration of inert material, a common practice in the past and one that has played an important rôle in the discrediting of this form of therapy. Chemical tests should also be devised.

One illustration among the many of the limitations of biological assay can be found in the so-called "rat unit." A number of years ago, it was ascertained by experiment that injections of extracts from the essential female sex organs could produce certain objective phenomena in female rats or mice which by operation had been rendered incapable of these manifestations spontaneously. The method naturally suggested itself as a means of biological assay of the specific



*Eli Lilly and Company*  
Filter presses used in extracting Iletin (Insulin, Lilly)

active principle deriving from the female sex glands. Later studies, however, have demonstrated similar agents capable of producing positive results from such unrelated sources as germinating grains, brewer's yeast, and the male sex glands. The method of assay is still used as it has a certain utility, but there is a suggestion in it of the older test for benzene that depended on the thiophene content.

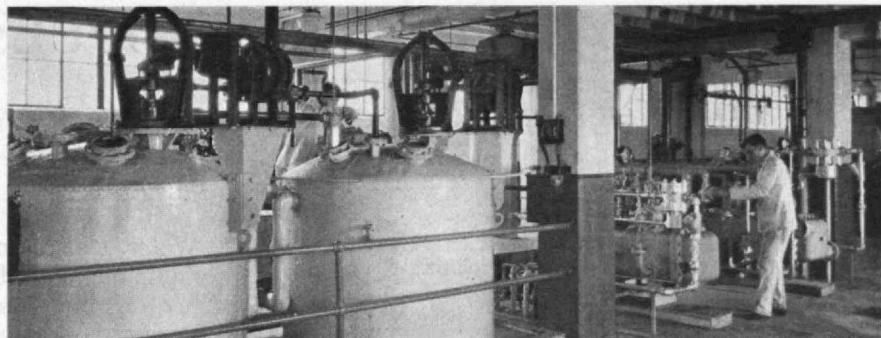
The third great problem of endocrine therapy lies in the cost

to the user. The endocrine glands of most animal species are very small and the percentage of active material in them a very low one. Even the better established substances now produced by adequate methods for efficient extraction are a heavy drain on the purse, and with some of the newer preparations the cost of adequate replacement therapy is prohibitive. As an illustration of this, the recently prepared extract from the adrenal cortex which has been demonstrated to be effective in Addison's disease costs about \$3000 a year for the amount necessary to treat a single case. Even in those glandular failures where the replacement therapy is at a minimum cost level through reasonably large supply of raw material and efficient methods of preparation, it can easily reach \$100 a year, a far from negligible sum for a large group of wage earners.

As the use of these substances, as noted before, is a replacement therapy and, further, as there is no certain evidence of glandular regeneration where once impairment has occurred, the administration must be continuous in the majority, at least, of the endocrinopathies.

The channel of administration constitutes a further complication bearing in part on the economic aspect. Certain of the extracts, such as insulin, are destroyed in the gastro-intestinal tract and so must be given by intramuscular injection and not the more usual and far simpler oral route. With others, such as anterior lobe pituitary substance, there is undoubtedly partial destruction in many individuals when administered orally, and so dosages must be high to insure the absorption of an adequate amount of active material. As the disadvantages of the daily use of the hypodermic needle are patent, many sufferers elect the less efficient and thus more costly oral route. The high dosage naturally affects the general supply and is a factor in the maintenance of high costs as the potential supply of raw material is definitely limited. Happily, many pituitary cases respond to the oral use of reasonable amounts of the gland.

The development of better diagnostic methods has demonstrated the wide spread of endocrine disorders even though it has frankly eliminated many putative cases that had their origin in the untrammelled assumptions of speculative endocrinology. Early recognition with appropriate treatment must be the goal of present endeavor until preventive medicine takes the final step. And for this latter, knowledge of the underlying etiology is essential and that knowledge today is almost wholly lacking. The solution of these present



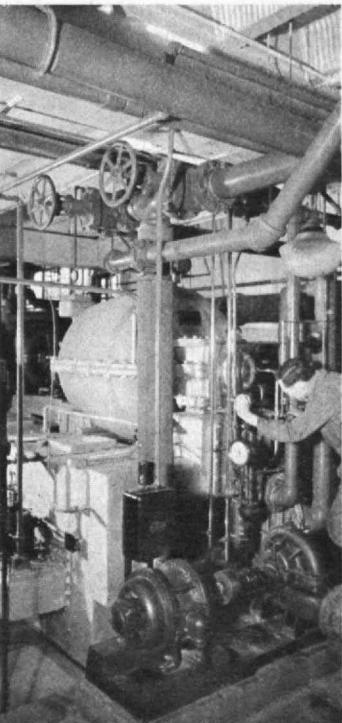
Precipitation tanks, ejectors, and vacuum stills used in the manufacture of Iletin

Eli Lilly and Company

problems as outlined, then, becomes of very real import in their social and economic aspects to the community at large.

**T**HE preparation of active extracts has been the work of biochemistry. Both chemistry and engineering must combine if the present major problems are to be solved. As a first step, improvements in methods of extraction are patently required. The present yield of insulin per unit of raw material is nearly 20 times as great as when this agent was first produced commercially, a change that is reflected in the progressive lowering of the cost of the finished product. Further, in the main, there is a steady increase in purity which both lowers the amount of inert impurities and lessens the hazard of side reactions from active contaminants. This is not always the case as the incidence of hypersensitivity accompanying insulin use has increased from roughly 3% to 13% in the last four years as reported from one well-known clinic.

In some cases the allergic reaction has necessitated the discontinuance of the medication. Increased production offers direct benefit not only in the lowering of the cost of material from natural sources, but it places in the hands of the chemist an adequate amount of intermediate products to permit of further investigation. Where sufficient raw material (extract) is available, past experience leads us to believe that the pure substances themselves may be isolated in quantities permitting of further study. While, in expert hands, a single milligram of pure crystalline substance may yield —



Eli Lilly and Company

Refrigeration machine for low temperature distillation in the manufacture of Insulin and Liver Extract

(Continued on page 52)

# REACTION PROPELLION

## *Adventures of the Rocketeers, Both Fanciful and Scientific*

BY J. RHYNE KILLIAN, JR.

"No, I did not imitate anything which had been done before! I invented six ways of violating the virgin azure! . . . Since I am a machinist as well as a pyrotechnist, on a "grasshopper" with steel springs, by successive explosions of saltpetre, [I can] hurl myself into the blue meadows where the stars are feeding!"

Rostand: *Cyrano de Bergerac*

CURRENT pother over jet, or reaction, propulsion is by no means novel, for man has been toying with the principle ever since Heron of Alexandria contrived his steam whirligig, the æolipile. The invention and widespread use of gunpowder, of course, gave great impetus to this activity because it made possible the powder rocket with its remote but provocative possibilities and its unique appeal to the imagination.

The charm wrought by these provocative possibilities has been of dubious benefit to rocket propulsion; by spawning wild predictions and undisciplined fancy it has added to the scientific disrepute of this propulsive agency. Romancer after romancer has hooked his fancy to a rocket and gone roaring off into the vault of heaven. Of these flights, the two most famous are Cyrano de Bergerac's and Jules Verne's, but there is a shelf full of others, including other famous names.

When this underbrush of fancy and sensationalism is cleared away, some sober, scientific work on jet propulsion, long obscured or distorted, becomes apparent.

Water, steam, compressed air, powder, and explosive liquid fuels have been tried. Let me outline the scientific progress that has been made, note the difficulties that have been encountered, and finish off with a cautious excursion into what has been optimistically, if not fancifully, termed astronautics.

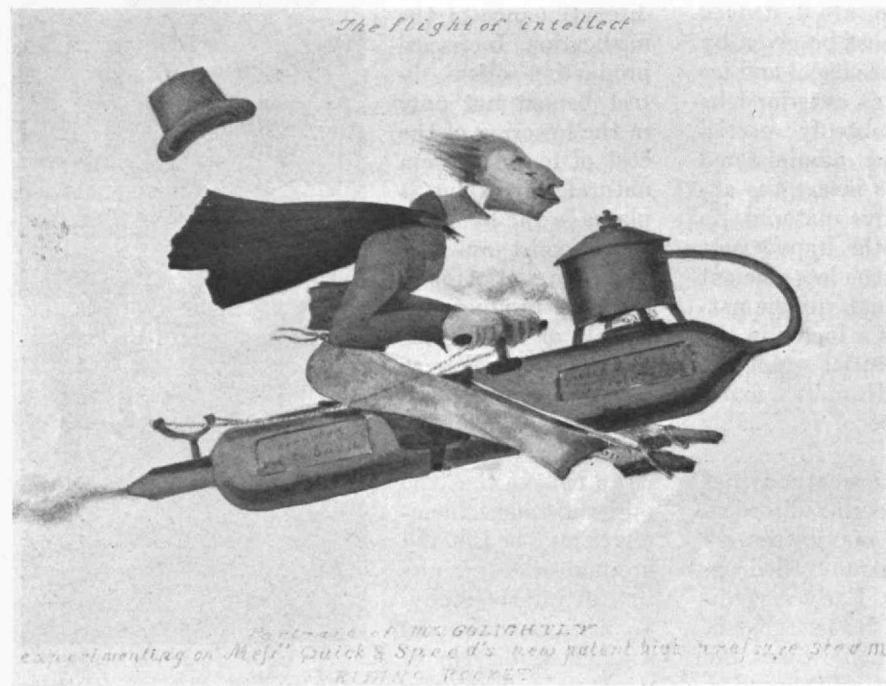
DURING the latter part of the last century her Majesty the Queen of England's Navy tested a boat propelled by two jets of water discharged from nozzles in its stern. The experiment, while a partial success, naturally provoked ribald comments from the junior members of the Service. The ship won the name of "The Squirt" (its real name was *Waterwitch*), and the Admiralty, sensitive to the indignity, dropped the matter.

A year before Queen Victoria condescended to take her first train ride, an Englishman with the apt name of Charles Golightly had taken out a patent for a rocket aircraft, a sort of eructating Pegasus which, fortunately for Mr. Golightly, was never built. Like the Navy's ship it was heartily ridiculed, though with more justice. To this the accompanying print reproductions offer eloquent testimony.

The plan to use steam jet propulsion was unique, but previous rocketeers considered gunpowder engines. Geraud in 1784 made such a proposal, and about ten years after Mr. Golightly conceived his bright idea, another Englishman, James Nye, suggested the use of powder rockets for balloon propulsion.

When the powder rocket was invented is not known although it is safe to blame it on the Chinese. It probably followed close upon the invention of gunpowder, and it was first developed as an instrument of war and as a life saving device, only latterly being employed in pyrotechnical displays — that crass and painful form of mob entertainment.

Captain William Congreve in 1804 initiated research to determine the distance to which weights could be propelled by rockets. He built several that traveled approximately 8,000 feet, and incendiary rockets of his design were successfully used in warfare at the Battle of Waterloo. A French pyrotechnician, Ruggieri, writing in 1802, claimed that his father first conceived of establishing communication between a wrecked ship and the shore by means of



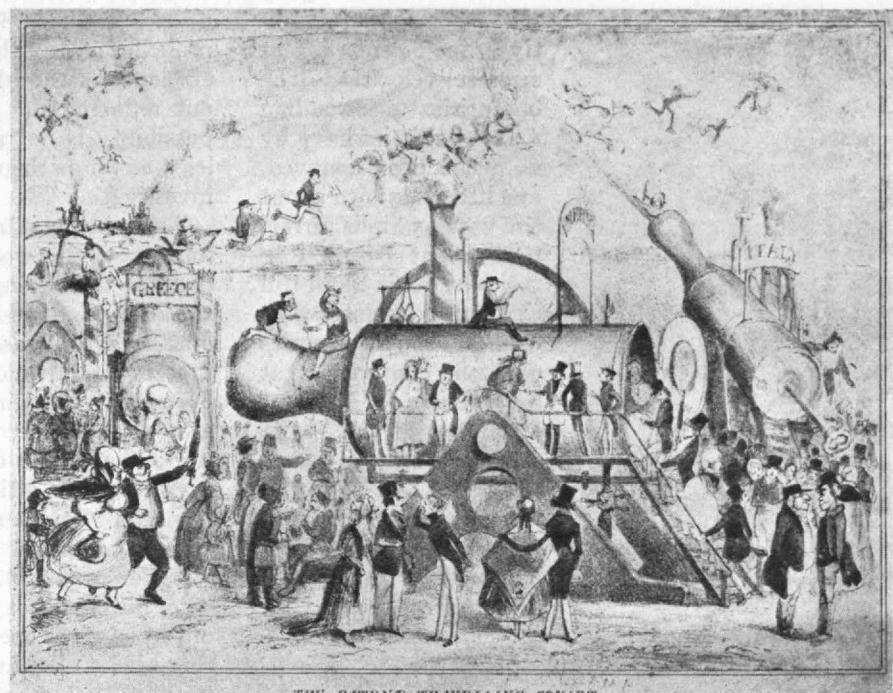
*The Flight of Intellect: portrait of Mr. Golightly experimenting on Messrs. Quick and Speed's new patent high pressure steam riding rocket (1841)*

line-carrying rockets. The method was introduced into England in 1807 by Trengrouse, of Helston, Cornwall.

It was not until the advent of the present century that rocket theory began to be carefully studied. It was a Russian, Professor Ziolkowsky, who was the first to discover that the efficiency of a jet is directly dependent upon a high exit velocity of the escaping gas or fluid.

Much has been heard, of course, about the investigations in this country of Professor R. H. Goddard. Working at Clark University under the auspices of the Smithsonian Institution, he has undoubtedly made marked progress with the theoretical aspects of the problem, although he has deemed it expedient to publish very little about the actual scientific results of his investigation. It is well known, however, that he has overturned one misconception of long standing: that the reaction which propels is the reaction between the exit gases and the air. He believes, and has adequate support from experiments, that the propelling force comes largely from the reaction between the rocket chamber and the propellant gases, rather than the air or other medium in which the jet operates. This fact is highly significant, for it means that a rocket will function as efficiently in a vacuum as in the air — perhaps more efficiently. It is this that has given the rocket-to-the-moon enthusiast so much hope.

I do not think that Professor Goddard has particularly interested himself in the application of jets to air and naval craft or land vehicles, most of his work being concerned with devising projectiles for carrying meteorological instruments high into the stratosphere. The Germans have been very active in experimenting with rocket-driven cars and planes. Fritz Von Opel, at the instigation of Max Valier, an Austrian, and with the assistance of a pyrotechnician named Sander, constructed and launched the first rocket car at Rüsselsheim am Main, March 11, 1928, by simply attaching two rockets to an ordinary motor car and letting them squirt. The rockets burnt out in about 30 seconds and the car was barely set in motion. Subsequent to this, three specially constructed cars were built with wings designed to keep the cars on the ground and equipped with a battery of 24 rockets each. A control was devised enabling the driver to fire the rockets one by one. With one of these cars Von Opel attained a speed of more than a hundred miles an hour on May 21, 1928.



*The patent traveling squirt. A variation on Mr. Golightly's invention*

Courtesy of Goodspeed's Book Shop



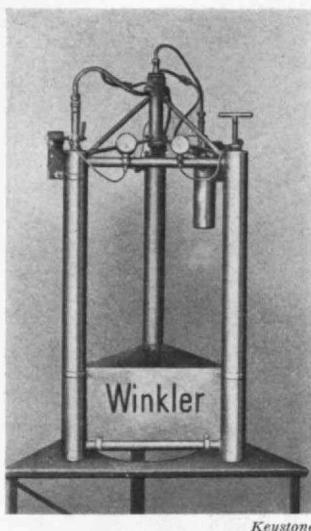
*Courtesy of Goodspeed's Book Shop  
New use for a kettle*

Valier became estranged from Von Opel and Sander during the course of these experiments and joined another group to experiment on a new type of rocket motor, with the tragic result that Valier was killed by an explosion. His death was a great loss for he had been engaged in some notable work on a rocket motor originally developed by Dr. Paul Heylandt, manufacturer and authority on liquefied gases. Valier's death recalled an incident on the Seine in 1886 when the inventor of a rocket-driven boat was killed at the first trial.

Von Opel and his associates, encouraged by the performance of their cars, set about to apply rocket propulsion to aircraft. First, they experimented with large model gliders. A tailless model having a wing spread of about 12 feet was equipped with rockets, and on its initial flight rose almost vertically with an acceleration 12 times that of gravity to a height of 300 feet, and then glided back to earth. In a subsequent flight it came to grief while traveling over 300 miles per hour, its failure being attributed to a structural fault.

Experiments were next undertaken with a man-carrying airplane. On the sole flight made before the plane burned, Fr. Stamer, the pilot, flew nearly a mile. The driving rockets, 16 in all, were mounted below the plane's center of gravity, but the eccentric thrust thus produced was easily offset by use of the rudder.

These experiments with cars and aircraft were promising, but inconclusive; the difficulties still to be overcome are legion. The fire hazard is enormous as well as the danger, and the eccentric thrust produced in vehicles presents a serious problem in dynamics. It has become evident that rocket motors are of little value at low speeds and



Liquid fuel rocket designed by Johannes Winkler of Dessau

Keystone

planes. The National Advisory Committee on Aeronautics has formally stated its belief that jet propulsion is yet too inefficient at airplane speeds to merit much consideration.

**Y**EET experimentation continues, for the objectives are enticing, however remote. Undaunted by Valier's death, Dr. Heylandt, and his determined chief engineer, Pielsch, are steadily refining their rocket designs. It early became apparent to them that the powder rocket had insuperable limitations and that a liquid fuel was necessary. They have designed, accordingly, a rocket motor to utilize a mixture of liquid oxygen and gasoline. These are conducted through separate pipe systems into the body of the rocket, after being vaporized and mixed, where they are ignited by a spark plug. This use of liquid fuel has made it possible to effect a continuous discharge over a considerable period of time, the force of which can be regulated continuously.

The Heylandt motor, as well as the other types previously mentioned, works on the direct reaction principle. Other inventions have suggested variations of Heron's whirligig. There is, for instance, the "reaction propeller" in which the propeller is driven by the properly directed exhaust of rockets mounted on the tips of the blades. Authoritative conclusions have been reached most unfavorable to such propulsive systems as these, although one investigator, Maurice Roy, has made the following comment: ". . . With a partial-reaction propeller, the total efficiency may possibly be slightly improved over that of the engine-propeller system. This result would be most certainly achieved if, by causing the burned engine gases to escape through

nozzles at the propeller-blade tips (*i. e.*, by using the propeller as an exhauster of burned gases), the thermic efficiency of the whole system could be improved without reducing the propeller efficiency too much. This possibility is not merely imaginary, and may lead, at least as far as theorists are concerned, to an interesting investigation." \*

The growing interest in stratosphere flight gives some impetus to this work on rocket motors for aircraft. It is possible that flying the stratosphere would permit the speeds (above 600 m./hr.) at which rocket motors would operate with reasonable efficiency. Furthermore, our present aircraft motors lose power at high altitudes and even super-charging may not be sufficient. A rocket motor, of course, would be independent of a rarefied atmosphere. It is conceivable that our present motors, useful for low altitudes and speeds, might be supplemented by rocket motors adapted to high altitudes and speeds, or used as boosters to get planes in the air.

Again Maurice Roy furnishes the apt commentary. "For purposes not yet contemplated, such as the driving of torpedoes or special airplanes at very high speeds (of the order of 1,000 km./h. = 620 mi./hr.), it is nevertheless possible that reaction propulsion may be of sufficient interest to warrant its experimental investigation. In such a case the value of this propulsion is partly attributable to the fact that the propeller is probably handicapped at such speeds (near that of sound in air) by a considerable reduction of its efficiency.

"Thus, at the end of this summary of a somewhat arid question, the conclusion to which I am brought will cause no surprise. It consists merely in an acknowledgment of the fact that the combination of a heat engine with a propeller forms the most advantageous moto-propelling system for airplanes. This is actually the solution adopted since the early days of aviation and it is responsible for the first airplane flight. The reaction power plant cannot impair its supremacy except within the range of very high speeds not yet reached nor utilizable under present conditions.

"This is an encouragement to technicians working for the improvement of heat engines and propellers to persevere in their efforts, which have already been rewarded by such important progress and which are not endangered by competition." †

Heylandt, Johannes Winkler, and most of the other experimenters have concentrated on the development of a rocket motor and have done little toward designing craft to be propelled by it. (*Continued on page 50*)

\* "La Propulsion par réaction." From *La Technique Aéronautique*, Jan. 15, 1930, pp. 9-20. A paper read before the Société Française de Navigation Aérienne, on January 29, 1930. Translation by the National Advisory Committee for Aeronautics.

† *Ibid.*



Wide World

The Von Opel rocket plane in flight

# THE TREND OF AFFAIRS

## IN THIS SECTION

*Intermarriage of Chemistry and Physics and New Research Methods Employed by Both (25); Achievements of the Rubber Technologists (21); Lady Engineers (22); Historical Note on a Pioneer Sanitarian (23); Double-Deck Elevators (24); Some Revealing Facts About Gasoline Dopes (21); The Army and Navy's Quest for Chemical Cooling for Internal Combustion Engines (21); American Optical Glass (28); The Ultracentrifuge (29)*

### Caveat Emptor

THE Heat and Power Division of the Bureau of Standards has rendered a genuine service to the motoring public by conducting an objective scientific investigation of the value of gasoline dopes. The Bureau tested some 150 such confections and found that not a single one of them when mixed with gasoline resulted in any important improvement in any feature of engine performance. H. C. Dickerson, in reporting the results of this investigation, defined gasoline dope as any substance which is used or proposed for mixture with gasoline in amounts less than one per cent. The term, of course, does not include the well-known knock suppressors, such as that used in the familiar ethyl gasoline, but none of the latter is available to the public in separate form.

The gasoline doctors who take advantage of gullible motorists make any number of preposterous claims for their various mixtures: they will prevent vapor lock, increase the power of the engine, decrease carbon, and increase mileage. The Bureau found no basis for any of these claims. Mr. Dickerson stated very definitely that the dopes "cannot be expected to improve starting, decrease crankcase dilution, or prevent vapor lock . . . carbon formation and economy are so dependent on adjustments and operating conditions that proof of the value of dopes is most difficult. In the testing of some 150 such dopes at the Bureau, exclusive of the well-known knock suppressors, not a single instance of any improvement has been observed in any feature of engine performance."

The Bureau of Standards is to be commended upon conducting investigations of this sort to keep the public properly informed about dubious products.

### Chemical Coolants

NOT to be outdone by the Army's trick of cooling airplane engines with ethylene glycol, the Navy has been experimenting with a near-relative, diethylene

glycol. This liquid, with a boiling point far above that of water (250° C.) and a freezing point considerably lower, is being used in an engine without a radiator. Instead, it is built with numerous cooling fins cast on the exterior of the jacket walls. In passing through these fins, the liquid is circulated around the cylinder block.

The Army's system employs a radiator just as water-cooled engines, but the ethylene glycol is sealed up so that it constitutes a permanent cooling fluid, requiring no replenishment and offering a greater temperature range than water, as well as adequate cooling qualities.

Since the Navy's system incorporates the radiator in the engine itself, "plumbing troubles" are avoided, weight saved, and, according to the engine's builders, the advantages of both direct air-cooling and liquid-cooling are obtained without their disadvantages. The engine as it has been built weighs less per horse power than comparable direct air-cooled motors.

Both Services are to be commended for their progress in developing better cooling systems. It is plausible that they may herald the day when automobile engines are cooled by sealed systems containing a liquid of high boiling point and proper viscosity, not subject to freezing at winter weather temperatures, and lasting the lifetime of the motor. Can an oil be found for the higher temperatures?

### New Uses for Rubber

RUBBER'S versatility has been greatly extended by the anode process; *i.e.*, the electrodeposition of rubber from latex, an operation similar to electroplating. Articles of intricate shape may be given in a single, inexpensive operation, a uniform coating of rubber in soft, semi-hard, or hard form. This coating, which may be varied from 0.008 to 0.125 inches in thickness, exhibits many qualities of strength and durability hardly attainable by another commercial process. The manufacture of rubber gloves by cement-dipping is facilitated by this method, seconds are reduced, and variation in thickness eliminated. Articles designed to serve in contact with corrosive gases and liquids may be electrocoated,

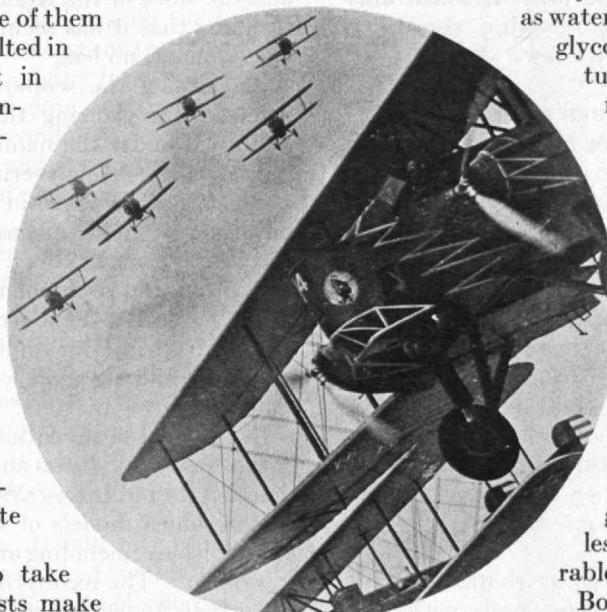


Photo by Warren Colby  
Courtesy Boston Evening Transcript



Southern California Edison Company

*First 10,000-foot oil well in the history of the world's petroleum industry. It was drilled by the Chanslor-Canfield Midway Oil Company in California. In 1926 this same company completed the drilling of the first well ever to reach a depth of 8,000 feet.*

including metal plating racks. The noise of automobile engine fans may be greatly reduced by such a rubber coating, and many other mechanical devices may be advantageously treated. The growing use of rubber to minimize noise and vibration is greatly served by this process.

Recent experiments have indicated that rapid oxidation takes place in cold milling of rubber, and means are being devised for preventing this softening.

In addition to these new manufacturing advances, there are novel uses for rubber, already tried and proved, which illustrate its growing versatility. Here are a few:

#### 1. RUBBER BEARINGS

Where lubrication by oil is difficult or impossible, and where other bearings are cut out owing to sand or other abrasives, rubber bearings endure. There are cases on record where they have outworn other bearing materials, such as *lignum vitae* and babbitt, by as much as ten times. The Vulcalock process of bonding rubber to a metal shell has done much to further the use of rubber bearings.

#### 2. RESISTANT TO HEAT AND OIL

New compounds with high resistivity to oil and heat have found wide application. Take for examples gasoline, oil, and paint hose, natural gas pipe packing, belts, containers for glacial acetic acid, pickling tanks, and rubber-lined valves.

#### 3. OVERSHOES FOR AIRPLANE WINGS

To remove ice deposits from wings, Geer and Scott, of Cornell University, have developed rubber pneumatic leading edges. This device embodies a thin rubber overshoe with fabric reinforcement, containing flat rubber tubes connected to an air pump. By pneumatically expanding or contracting the overshoes, the ice deposit is cracked and its adhesion destroyed.

### Woman's Work Is Never Done

WE were not a little disconcerted recently when we heard of the Atalanta Limited — an engineering firm composed exclusively of women engineers. We had become used to the idea of women in science, architecture, or business all right, and the flutter of skirts in nearly every other department of civilization, but until now, we would smile a peculiarly masculine, superior smile at the idea of women seriously and soberly considering engineering as a much desired profession. Though we might willingly admit the possibility of an exceptional woman with an engineering mind (a number matriculate each year at M. I. T.), we were not prepared to encounter an entire company, offering a definite challenge of competition to the downright supremacy man has enjoyed in this long-possessed field. The firm is in London, in conservative England, and the work of the Atalanta Limited has been so outstanding that it has secured contracts from the British Government, no less.

An idea of the scope of this development may be gained from glancing through the English magazine published under the name of *The Woman Engineer* by the Women's Engineering Society, incorporated in 1920. It is far removed in form, style, and content from the usual woman's magazine, a note of severity fairly emanating from its cover. We have browsed in its pages with profit and recommend it to the intellectually curious. A perusal of the journal led us finally to the library where we opened our round eyes at the progress women have been making while we have been tending to science and engineering matters.

In the field of invention, we were interested to note in the New York *Times* an announcement of the Exposition of Arts and Industries (which opened on September 30), in which models of various inventions by women are on display, including an exhibition of patents granted to women. The records of the patent office reveal that more than 15,000 patents have been issued to women and that in the last 15 years there has been a steady increase. Nor are these inventions confined, as you may suspect, to household inventions. Less than one-fourth, to be exact, are made in this line. They are mostly in the field of industrial arts, transportation, and agriculture. "Many of the inventions," continues Mrs. Harriman, chairman of the exposition committee, "have to do with railroads, including devices for increasing the comfort of travelers, improvements of road beds and rails, traffic signals, and block signals."

The Women's Bureau of the U. S. Department of Labor offers an imposing array of statistics. Besides managers and superintendents of factories, bankers and bank officials, inventors, engineers, and architects, there are, in the lower ranks, draymen, teamsters, garage laborers, telegraph operators, steam and street railway laborers. In fact, the 1920 census revealed that out of the 572 occupations listed, women were working in all but 35. We are eagerly awaiting the statistics compiled from the 1930 census. Other pertinent and eye-opening facts in the employment of women are: 2,000,000 in domestic and personal service; 1,500,000 in clerical operations; over 1,000,000 each in professional and

agricultural pursuits; and more than 650,000 and 200,000 in trade and transportation, respectively. Preliminary reports of the 1930 census estimate the number of wage-earning women at 10,000,000, and record for the first time the vast army of housewives as 23,000,000 strong.

Statistics, however, deal a blow to the prevalent conception that women have gone career-crazy, despite Atalanta Limited. The facts show that the majority of women work because of economic necessity and not from any irresistible desire for careers. The average married woman worker keeps house in addition to her other responsibilities, so it has truthfully been said that most women are working to preserve the home rather than to destroy it, a theory arising perhaps from the wounded pride of the male of the species.

Even in China, where we had supposed the women were conforming placidly to established custom, we find that the best motor mechanic in the usual town is a Chinese woman. "The men, of course, do most of the work, but if anything goes wrong, or if they get stuck in any way, they call for her." She comes out with her baby, has a good look, asks a few questions, and proceeds to direct operations, still keeping a watchful eye on the baby.

Prejudice, however, still carries on in the Post Office Department in England. A woman applying for a position in post office engineering received an official note pointing out that the examination was only open to male candidates, a fact not mentioned in the regulations, by the way, and "regretting that her failure to satisfy this requirement was not observed sooner"! Others regretted this also. And so it goes.

Though the Government recognizes distinctions of sex, it is pleasing to discover that something does not. When Miss Winifred Brown, British aviatrix, was congratulated by His Majesty the King for taking the King's Cup from some of the finest professional men aviators, the Manchester *Guardian* remarked: "Miss Brown's feat is proof — if proof were needed — that the air knows no distinctions of sex." (And we're not a little relieved, too.)

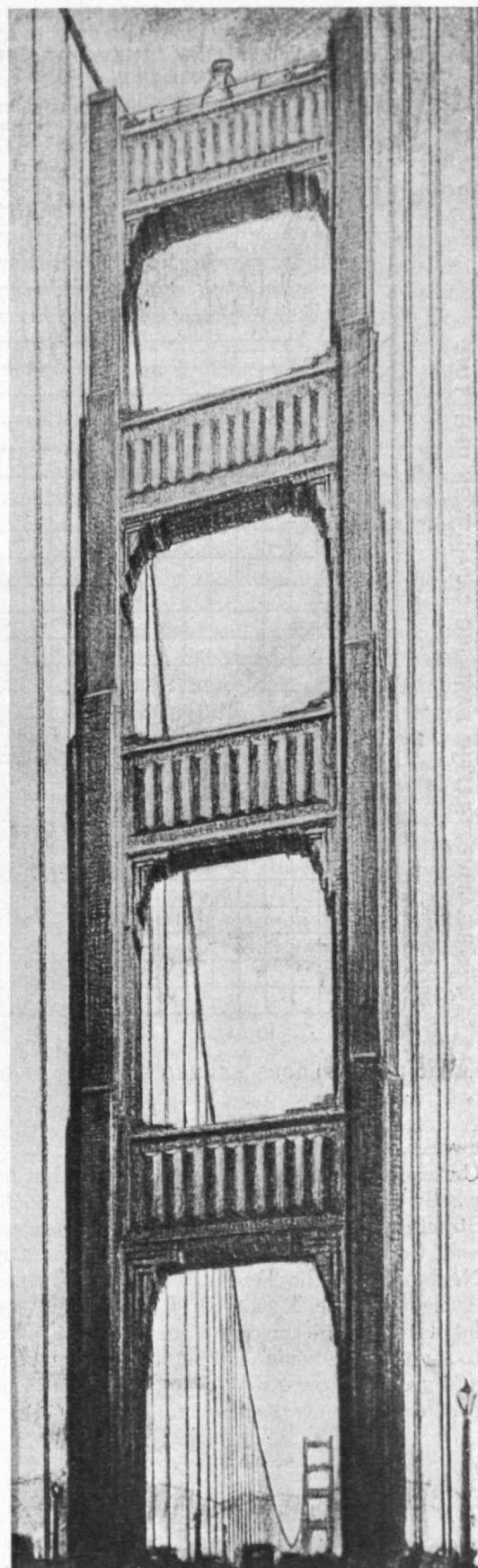
### The Poet Who Was a Plumber

SANITARY engineers owe a debt of gratitude to Lytton Strachey for his having exhumed, in his latest book, "Portraits in Miniature," the life of Sir John Harington, poet, godson of Queen Elizabeth, and sanitary engineer. In fact, all folk who enjoy the luxuries of plumbing should welcome Strachey's account of how we came by the ingenious *lieux à l'anglaise*, which we take for granted without giving a thought to its romantic origin.

Sir John presented a minute account of his invention, with measurements, diagrams, and prices in the appendix of a book entitled "The Metamorphosis of Ajax." Queen Elizabeth was at first offended, not by the appendix, but by some of the satirical digs in the body of the treatise. "But before very long she relented," says Strachey. "With her supreme sense of the practical, she saw that, as she put it, 'the marrow of the book' was not entirely ludicrous; she sent down word to the poet that she approved of his invention; and eventually she set the fashion for the new contrivances by installing one of them in Richmond Palace, with a copy of the Ajax hanging from the wall."

It is singular, though not inappropriate, that the invention should have been made by a courtier and a poet — an ingenuous, preposterous poet, but, nevertheless, a poet. The poetry that Harington cherished is forgotten, but the mundane invention which he held in low esteem lives.

Without diminishing the honor due Sir John, it should be pointed out that his *cabinet d'aisance* was not entirely new to the world. He resurrected, perhaps without knowledge of previous



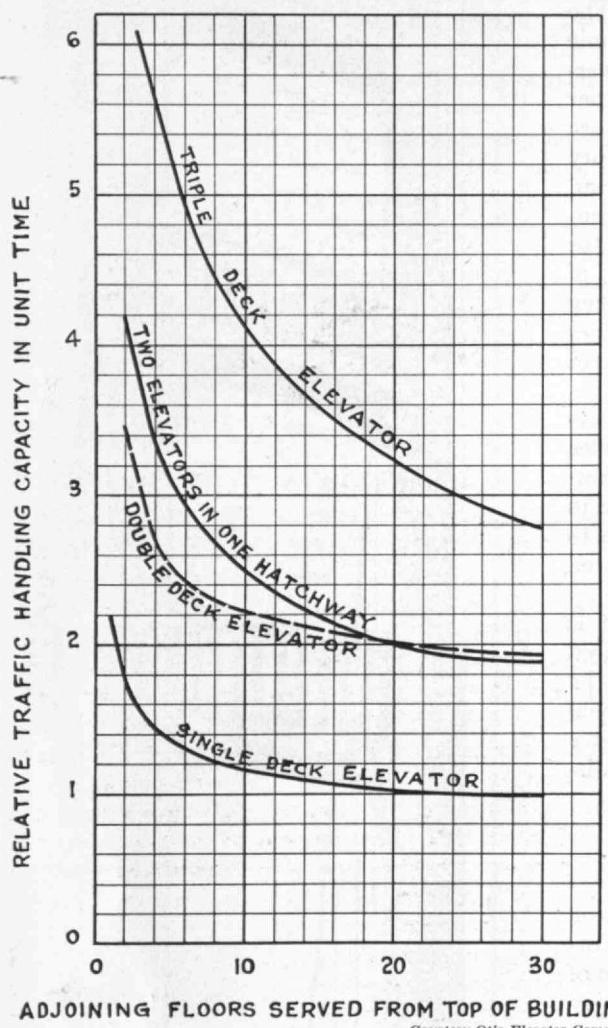
Courtesy Engineering News-Record

Architectural rendering of one of the towers in the proposed Golden Gate bridge, the span of which is to break all existing records with a length of 4,200 feet

**CURVES SHOWING RELATIVE TRAFFIC HANDLING CAPACITY OF DIFFERENT TYPES OF ELEVATORS IN A 31 STORY BUILDING. ELEVATORS SERVING VARIOUS NUMBERS OF FLOORS**

Note No. 1 Automatic Signal Control-Elevators assumed with same dimensions of hatchway section in all cases

Note No. 2 Rated speed of Elevators 800 F. P. M.



devices, a principle known and used by the people of Crete and Rome. He added a new twist, but he did not wholly originate. Students of such things should consult Strachey's "Portraits in Miniature" (Harcourt, Brace and Company, \$2.50) and in addition, Dr. Albert Neuburger's "The Technical Arts and Sciences of the Ancients" (The Macmillan Company, \$10.00, translated from the German by Henry L. Brose). We venture to say that the reader will be surprised at the ingenuity and progressiveness with which the ancients solved the problems of sanitary engineering.

### Going Up!

IN New York's Empire State Building the elevators reach a maximum speed, without passenger discomfort, of 1,000 or more feet per minute. No more need be said to indicate the success achieved by mechanical and electrical engineers in providing swift, utterly reliable, vertical transportation.

The problem, however, does not end with swiftness and reliability. How can the rentable area preempted by elevators be decreased in large buildings? Speeds are dictated by law and limited by human endurance; efficiency in present type elevators is virtually at a maximum. What, then, is left to be done?

There are several possibilities, two of which Mr. L. A. Peterson of the engineering staff of the Otis Elevator Company recently set forth for The Review. In his opinion, the two systems most likely to be considered for future buildings of great height are multiple-deck elevators and multiple-unit elevators. Of these two, the former is by far the simpler and involves fewer departures from accepted practice. It consists, in its simplest form, of double compartment elevator cars arranged vertically a standard floor height apart, so that with the building floors all of a fixed height, the elevator serves two floors simultaneously. The number of possible required stops is thus reduced by one half, and the round trip time required to transport an equal number of passengers with single-deck elevators is considerably shortened.

This elevator is as simple in operation as a single compartment elevator, but the platform area is doubled without increasing the area of the hatchway. Each compartment is equipped with power-operated doors, under the control of an attendant, and so interlocked that the car can be operated only when all car and hatchway doors are closed and locked.

With double-deck elevators, the upper compartment will normally, during periods of intensive traffic, serve the odd-numbered floors and the lower compartment the even-numbered floors. Two lower terminal floors will serve simultaneously as terminal landings and will be connected with ramps or stairs, or preferably with "up" and "down" escalators. Passengers entering the cars at the lower terminal will, therefore, choose the compartment serving the floor to which they wish to go. During periods of intermittent traffic, when a single compartment is adequate, the elevators may be operated so as to serve all floors with the upper compartment. An installation of double-deck elevators of this type is nearing completion in the 63-story Cities Service Building in New York.

With the object of reducing required hatchway space, the installation of two or more separate elevators in the same hatchway may be considered. This arrangement demands two separate hoisting machines and two separate systems of control.

The elevators would be so arranged that the upper car would leave its lower terminal and proceed up the hatchway a minimum distance before the lower car could leave its terminal. The upper car would serve a group of floors in the building directly above those served by the lower car. The number of floors served by each elevator must be so proportioned that the round trip time of both is approximately the same. The use of double lower terminal floors would permit the simultaneous loading of the two cars and more or less simultaneous unloading. The use of a single lower terminal floor would necessitate taking the lower car out of service during the lower terminal loading and unloading time of the upper car.

Either or both of these systems will in all probability be used in future high-rise buildings, with such comparative economy in space that the economic limit in building heights will be materially increased. In general, about the same amount of space is required with both systems for an equal quantity of elevator service, although variations in conditions may sometimes dictate one as more desirable. At present, however, it seems likely that popular preference will be extended to the use of double-deck elevators.

### New Research Tools

"The tools of mankind set the limit of man's achievements."

*Dr. Karl T. Compton*

THE average layman of the present day has a fairly definite impression of the general field of activity of the chemist. If pressed, he will opine that a "chemist is a person who is either trying to find out what things are made of, or is endeavoring to prepare some entirely new material." In this broad, general view, Mr. Layman is not far from the truth, but probably he does not realize that the chemist is able to recognize the changes which he effects only by means of observing changes in the physical properties of the materials being studied. In the last analysis, then, the chemist is fundamentally a physicist.

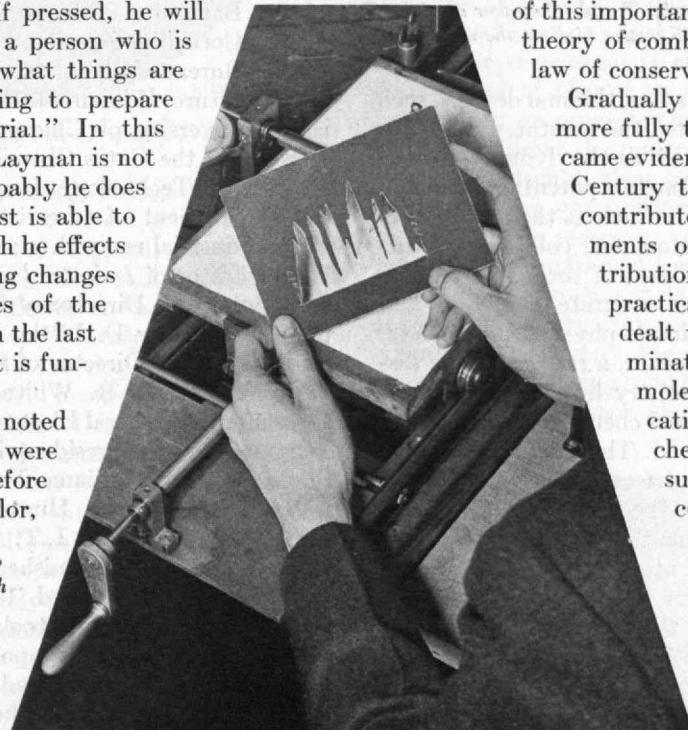
The earliest chemists noted those properties which were most superficial and therefore obvious; such as the color,

*M. I. T. Photo*  
Below: Photo-electric Integrator developed by Dr. Truman S. Gray, '28, of M. I. T. Intricate mathematical problems are solved rapidly and accurately, based on the modification of

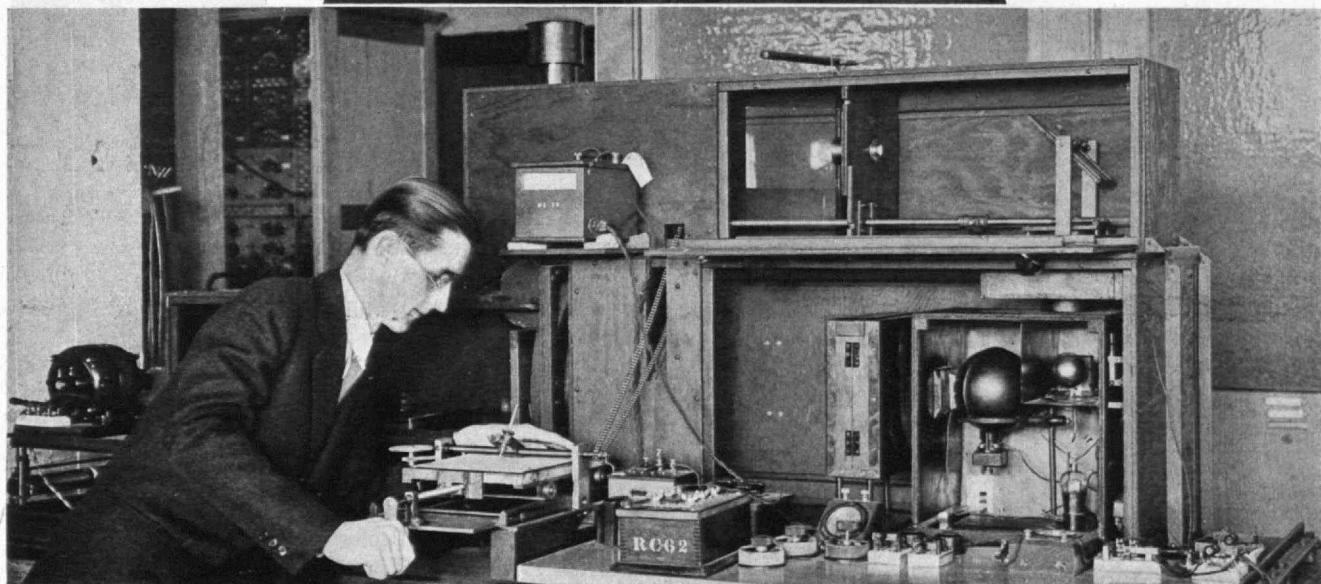
odor, and taste, or whether the substance was solid, liquid, or gaseous. Later it was observed that some materials would burn and that some would not, that some dissolved in water and others were unaffected by water, and that some of those which did dissolve gave off heat and some absorbed heat. Thus the chemists were naturally led to the perception of changes of energy resulting from the interaction of substances.

So long as his knowledge of these phenomena was merely qualitative, however, the chemist made little real progress. Not until the development of the balance as a chemical tool by the famous Lavoisier in the latter part of the Sixteenth Century did chemistry begin to measure the effect of simple changes and compare quantitatively the results of various reactions. This one tool, for example, soon led to the discovery that when a substance burned, it gained weight instead of losing it as had formerly been supposed. Recognition of this important fact soon led to the correct theory of combustion and indirectly to the law of conservation of matter.

Gradually the desirability of utilizing more fully the tools of the physicist became evident and during the Nineteenth Century the various fields of physics contributed to the research requirements of the chemist. These contributions were both theoretical and practical in character. The former dealt with the existence and determination of the relative sizes of molecules, and with the application of thermodynamics to chemistry. The latter included such mechanical tools as the centrifuge, the barometer;



*a beam of light in accordance with the problem. Measurement of the beam gives the solution.*  
*Above: The silhouette of a graph, the form in which problems are submitted*





Rouse

*At the Colonial Exposition in Paris. Temple d'Angkor at night. Below is shown an illuminated fountain 45 metres high on the exposition grounds*

vacuum pumps, gauges, and so on; thermal devices, such as the thermometer, calorimeter, thermostat, pyrometer, and so on; electrical tools, such as the dynamo, motor, galvanometer, ammeter, voltmeter, potentiometer, and so on; and optical instruments, such as the microscope, spectroscope, camera, refractometer, colorimeter, turbidimeter, and polarimeter. Most of these instruments served mainly for the more accurate detection and quantitative estimation of simple physical properties.

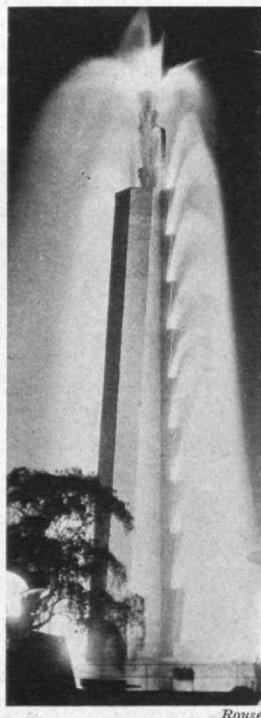
Beginning about 1900, however, a rapid series of discoveries in physics and chemistry began the development of a new phase of physical chemistry which is still going on with increasing speed. These new discoveries involve the more intimate phases of the structure of matter and consideration of the forces which operate upon the atoms and constituent electrons and protons. Researches on the spectra of atoms and molecules have led to the development of new theories of radiation and these in turn, are serving to throw new light upon the way in which matter is built up. These theories and the researches which they suggested have required the development of new research tools which were never dreamed of in earlier days. The methods used in dealing with ultraviolet and infrared radiation, the new knowledge of the properties and applications of x-rays, the application of electronic phenomena to various types of vacuum tubes for many different purposes, have undergone an extraordinary development in recent years.

These ramifications of knowledge have come so rapidly and have application to so many other fields that it is difficult for a worker in any one field to keep adequately in touch with progress in the others. *Chemical Abstracts*, the publication by means of which the chemist endeavors to keep in touch with his professional literature, printed during 1930 no less than 32,731 abstracts of chemical papers, not to speak of 21,246 patents, this material being drawn from 1,500 chemical journals from all over the world. It is evidently highly desirable, therefore, that from time to time a special effort be made to draw attention to new research methods discovered in one field but likely to prove valuable and fruitful when applied to another.

It is for just this reason that a Symposium on New Research Tools was held in September at the Buffalo Meeting of the American Chemical Society under the auspices of the Division of Industrial and Engineering Chemistry. As has always been true, these new research tools are fundamentally physical in character. It was, therefore, eminently fitting that the Chairman of the Symposium Committee should be President Karl Taylor Compton, of the Institute of Technology and a physicist. For the purpose of selecting the particular topics and speakers for the symposium, Dr. Compton enlisted the co-operation of a group of eminent research workers in pure and applied science. The field of pure science was represented by Professors Roger Adams, Head of the Department of Chemistry, University of Illinois; Wilder D. Bancroft, Professor of Physical Chemistry of Cornell University; Frederick G. Cottrell of the Bureau of Chemistry and Soils, U.S. Department

of Agriculture; William D. Harkins, Professor of Chemistry, University of Chicago; Arthur A. Noyes, '86, Director of the Gates Chemical Laboratory, California Institute of Technology; Hugh S. Taylor, Chairman of the Department of Chemistry, Princeton University. From industrial research groups came Drs. Harrison E. Howe, Editor of *Industrial and Engineering Chemistry*; John Johnston, Director of Research, U. S. Steel Corporation; Arthur D. Little, '85, of A. D. Little, Inc.; C. E. K. Mees, Director of Research, Eastman Kodak Company; Willis R. Whitney, '90, Director of Research for the General Electric Company, and Robert E. Wilson, '16, Vice-President in charge of development, Standard Oil of Indiana. For its Secretary, the committee selected E. H. Huntress, '20, Assistant Professor of Chemistry at M. I. T. After some months of work this group of distinguished research leaders selected 15 important new research tools for discussion in the symposium and procured outstanding workers in each of the fields to present papers on these topics.

The 15 new tools discussed were roughly divided into three groups. The topics and speakers in the group on Radiation and Atomic Structure were: "The Use of Raman Spectra in Qualitative Analysis," Professor Donald H. Andrews, Johns Hopkins; "X-Rays as a Research Tool in Chemistry and Industry," Professor George L. Clark, University of Illinois; "Molecular Beams," Dr. John Bellamy Taylor, '97, General Electric Research Laboratory; "Dipole Moments," Professor Charles P. Smyth, Princeton



Rouse



H. Armstrong Roberts

*A parachutist leaving his plane for a drop to earth*

University; "Molecular Spectra," Professor Harold C. Urey, Columbia University. A second group of topics deals with new advances and applications of certain practical tools: "New Gauges," Dr. Saul Dushman (his paper was delivered by Lewis R. Koller), General Electric Research Laboratory; "Catalysis," Dr. Per K. Frolich, '23, Standard Oil Development Company; "High Pressure Technique," Professor Frederick G. Keyes, M. I. T.; "Distillation," Dr. Warren K. Lewis, '05, M. I. T.; "High Temperature Technique," Dr. Robert B. Sosman, '04, United States Steel Corporation; "High Temperature Control," Dr. Lewis R. Koller, General Electric Research Laboratory. The third group of topics deals with various aspects of micro-analysis: "Micro-analysis of Solutions," Professor Fred Allison, Alabama Polytechnic Institute; "Micro-analytical Methods as Time and Labor Savers," Professor Emile M. Chamot, Cornell University; "Micro-analysis of Gases," Dr. Dean Burk, U. S. Department of Agriculture; "The Ultra-Centrifuge and Its Field of Research," Dr. John B. Nichols.

**A THOUSAND** or so scientists and laymen presented themselves for this two-day symposium and some of the things they heard about research tools may be briefly summarized as follows:

#### RAMAN SPECTRA

A practical scheme of qualitative chemical analysis has been built up through the use of the Raman spectra recently discovered by Sir Chandraschakra Venkata Raman of the University of Calcutta. While observing the spectrum formed by a beam of light through a liquid, Raman noticed a special set of lines, the frequency of whose vibrations depended on the internal structures of the molecules of the liquid. Through a classification of these vibrations, it is possible to determine what substances are in a compound. Recent studies of the intensity of the Raman lines indicate that they vary with

the quantity of a substance. In time, this may be applied to quantitative chemistry with accurate results.

#### X-RAYS

By an analysis of the secondary fluorescent x-radiation from unknown specimens placed either inside special new x-ray tubes or outside, quantities of a substance as small as 0.001 milligrams can be detected. The evolution of the present high intensity x-ray tubes has made possible measurement of diffraction patterns in fractions of seconds and the chemical and physical changes in a system are registered as changing patterns on moving pictures.

#### DIPOLE MOMENTS

Although it is generally considered that molecules consist of particles of positive and negative electricity in equal amounts and neutralize each other so that the molecule as a whole is not electrically charged, it has been found that one part of the molecule may contain more positive or negative electricity than another part. This excess of charge on one part of the molecule is balanced by an opposite charge of the same amount on the other side of the molecule.

These molecules then contain two poles, a positive and a negative one, and are known as dipoles. If these molecules were placed in an electric field, the negative pole would be attracted toward the positive side of the field and the positive pole toward the negative side. If the field is alternating, as is the case in a great deal of commercial electricity, the molecules in this field would be constantly turning from side to side. This is of special importance when considering insulation for electric wires and cables.



Courtesy New Jersey Zinc Company

*Effective use of photography to demonstrate a tool. The interesting repetition is achieved through multiple exposure*

### MOLECULAR SPECTRA

Molecular spectra have yielded in recent years considerable information on properties of gaseous molecules; such as their size, shape, and the energy required to separate molecules into separate atoms. Molecules thus studied in the past have been found to be in greater part composed of two atoms, but recent information indicates that some contain more than two.

### HIGH PRESSURE TECHNIQUE

Apparatus for the measurement of pressure has reached a stage where a precision of one part in ten thousand to 600 atmospheres is not difficult.

### HIGH TEMPERATURE TECHNIQUE

Today we have developed workable techniques to produce a newer uniform temperature in liquids, but it is not possible to heat solids to the desired uniform temperature because of lack of suitable apparatus.

### HIGH TEMPERATURE CONTROL

With the invention and practical use of the "electric eye" to watch the furnace and see that it does not get too hot, the problem of regulating heat in a furnace without human attention has been solved. The "electric eye," or photo-tube, is fixed on the furnace wall or some object in the furnace and takes its cue directly from the whiteness of the heated surface. It is thus a very sensitive and accurate indicator, since the brightness of an object varies about 16 times as fast as its temperature.

### MICRO-ANALYSIS OF SOLUTIONS

It is possible by the new magnetic-optic process to detect substances in amounts as minute as one part in 100 billion. The new process was devised after investigations in the measurement of certain time effects of reaction times—as short as billionths of seconds and even less—in the optical properties of liquids with respect to magnetic forces. The speed of light or the speed of an electric current along a wire 186,000 miles per second is the timing device utilized. It is now possible to detect in our foods very minute quantities of metals



*An optical pyrometer ("electric eye") measuring*

which until recently were not known to be a content of foods, and the importance of which to health has been a question of much concern of late.

### MICRO-ANALYTICAL METHODS

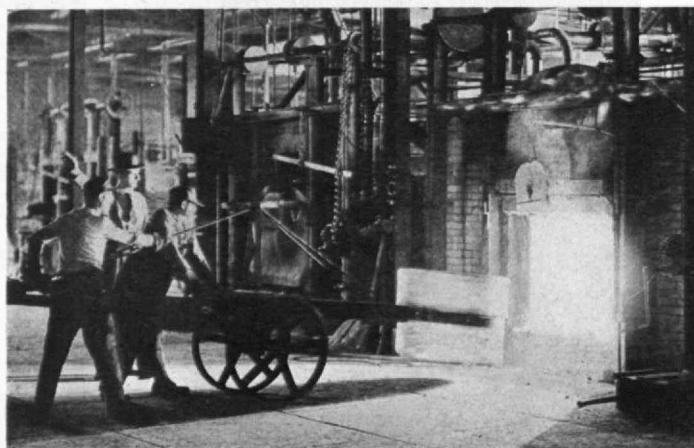
The savings possible in time and material alone where these methods have been introduced run into impressive figures. In one large corporation, routine control methods formerly requiring about two days have been reduced to several hours; in another, the adoption of micro-analytical methods has reduced expenses tens of thousands of dollars. Furthermore, we must credit these methods with requiring less labor.

### U. S. Optical Glass

*Written for The Review by J. F. Brandt*

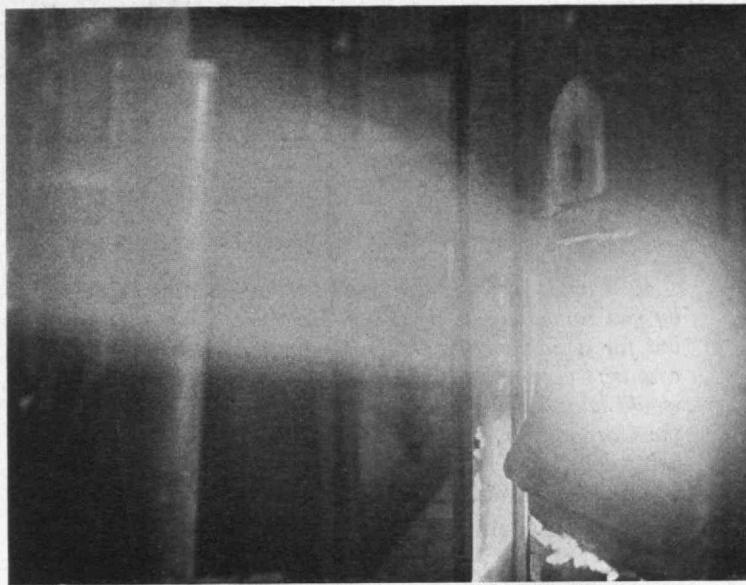
**G**LASS in all its various forms has become so common in our daily life that few of us pause to consider its importance to our progress in civilization. Particularly is this true of optical glass. Yet this is one of the most influential silent partners of man, for from optical glass comes the lens, and from the lens a multiplicity of benefits without which we could not maintain the present height of our civilization.

The lens gives wings to science; speeds production for the world's insatiable appetite; projects romance and adventure into millions of humdrum existences from brightly lighted silvered screens; writes vivid pictured history through the unerring eye of the camera; raises the shroud of darkness which otherwise would envelope the tremendous celestial cycles in which we live; administers to human ills; enlarges the sphere of usefulness and happiness of those whose eyes are weak or aged; focuses light to dispel the darkness-shrouded dangers for aviators who bring precious cargoes to earth safely. The lens has peered into every corner of our modern world; shown the way to wipe out the horrible plagues which once ravaged mankind; made possible the standardization of metal qualities; brought the



*Courtesy Bausch and Lomb Optical Company*

*Removing a pot of glass from the furnace*



Courtesy Bausch and Lomb Optical Company

*2,600° of heat in an optical glass melting furnace*

criminal to justice; and in many other ways powerfully influenced our individual, industrial, and community lives.

Yet as important as it is to human welfare and happiness, optical glass is manufactured in only a very few places in the world. Three firms in Great Britain, one in Germany, and one in France make it. At present the only manufacturer in the United States producing optical glass in commercial quantities is the Bausch and Lomb Optical Company at Rochester, N. Y. The Bureau of Standards has successfully made it, but, of course, not in commercial quantities. This rarity of manufacture is not caused by the lack of demand for optical glass, for quite tremendous quantities are necessary every year, but by the almost unequaled difficulties encountered in the making of it. For instance, every single constituent of the glass must be absolutely pure, and even those used in making the pots in which the glass is to be made have an effect on the finished product. The slightest trace of iron, for example, in any of the chemicals will turn the glass green, thus destroying the value of hundreds and hundreds of pounds of this very expensive product. Even with every engineering facility and laboratory control, 800 pounds of glass will yield only about 25 pounds of eyeglass lenses.

In 1912 the Bausch and Lomb Optical Company started serious experiments in the making of optical glass. Prior to that time, Mr. William Bausch had experimented with small crucibles with only slight success. But by 1914 results were so encouraging that two furnaces were built, each large enough to hold a pot containing about 600 pounds of glass of the ordinary density. This was of exceptional importance to the United States in the World War. Up to this time all optical glass had been of foreign manufacture. It was necessary not only for every day life but for our armies and navies. Therefore, a little before the beginning of the War, the Directors, respectively, of the Geophysical Laboratory and the Bureau of Standards at Washington offered the facilities of those bodies of scientists to Bausch and

Lomb to aid in increasing the output of optical glass. If work had not already been done by Bausch and Lomb, it is quite probable that very little success would have attended their efforts for a long time, and our war forces would have been very seriously handicapped. As it was, it was possible to start manufacturing binoculars, range finders, telescopes, and other military optical instruments almost immediately in the needed quantities.

Once determined, the chemical constituents of optical glass cannot be altered to any great extent. Experimentation at the present time must be along other lines. Boro-Silicate Crown as made at Rochester today has a transmission of 99.6% per centimeter of thickness and represents one of the highest qualities of optical glass in the world. Within the last few years, the laboratory has been able to improve the color as well as the transmission of the glass, but most of the work has been done in adding greater stability so that it will stand up under atmospheric conditions or sunlight for longer periods. Scientists are now working on improving the crucibles in which the glass is melted, each kind of glass having a chemical effect on the crucibles.

### *A Pound of Feathers: Weight 50 Tons*

**A**NOTHER research tool described at the recent meeting of the American Chemical Society (see page 25) is the ultracentrifuge—an elaboration of the well-known cream separator principle. The new feature of the ultracentrifuge lies in the fact that the observer is able to watch and photograph the rate of movement of the suspended material while the machine is rotating at high speed. This, in turn, makes it possible to determine the size of the particles.

In order to prevent heating, the low-speed types are run in hydrogen or helium gas; the high-speed type, however, must be run in a vacuum to function satisfactorily. Speeds of 40,000 r.p.m. can be developed which are equivalent to a peripheral speed of 300 yards a second. Centrifugal forces 100,000 times that of gravity are produced. In other words, a pound of feathers would weigh 50 tons if such a gravitational force existed on the earth.



Courtesy Bausch and Lomb Optical Company

*Six to eight months elapse before clay pots for glass making are ready*

# INSTITUTE GAZETTE

## Alumni Questionnaire

IN June the Alumni Association mailed to every former student of the Institute with a good address, a questionnaire containing carefully prepared questions about the proposed Alumni Reorganization Plan prepared by a committee of the Alumni Council. By August 6, 1,621, or 18.5%, of the questionnaires had been returned, and of these, 21 were left blank and 16 were unsigned.

The returns are sufficient, however, to indicate how the voting will go. We present below a list of the questions with the number voting yes, the number voting no, and the number not voting listed in that order beneath each question.

1. *Do you favor continuing the alumni organization exactly as it exists and functions at present?*

Yes 236 No 1,197 No vote 151

2. *Do you favor the sweeping change proposed in the report for electing Term Members of the Corporation, and for running the Alumni Association by a House of Delegates to be elected according to geographical divisions of the country, leaving to the Boston Council only the responsibility for local affairs?*

Yes 697 No 740 No vote 147

3. *Do you consider that our present system is satisfac-*

*tory, with the single exception of the method of electing Term Members, which has been the point specially criticized?*

Yes 756 No 581 No vote 247

4. *Would you favor a system whereby the annual election by you would not be for Term Members directly as now, but for a nominating committee from all sections of the country geographically, which nominating committee would have the power to select the three Term Members of the Corporation, the work of this nominating committee being done largely by correspondence, as has been shown to be feasible by other national organizations?*

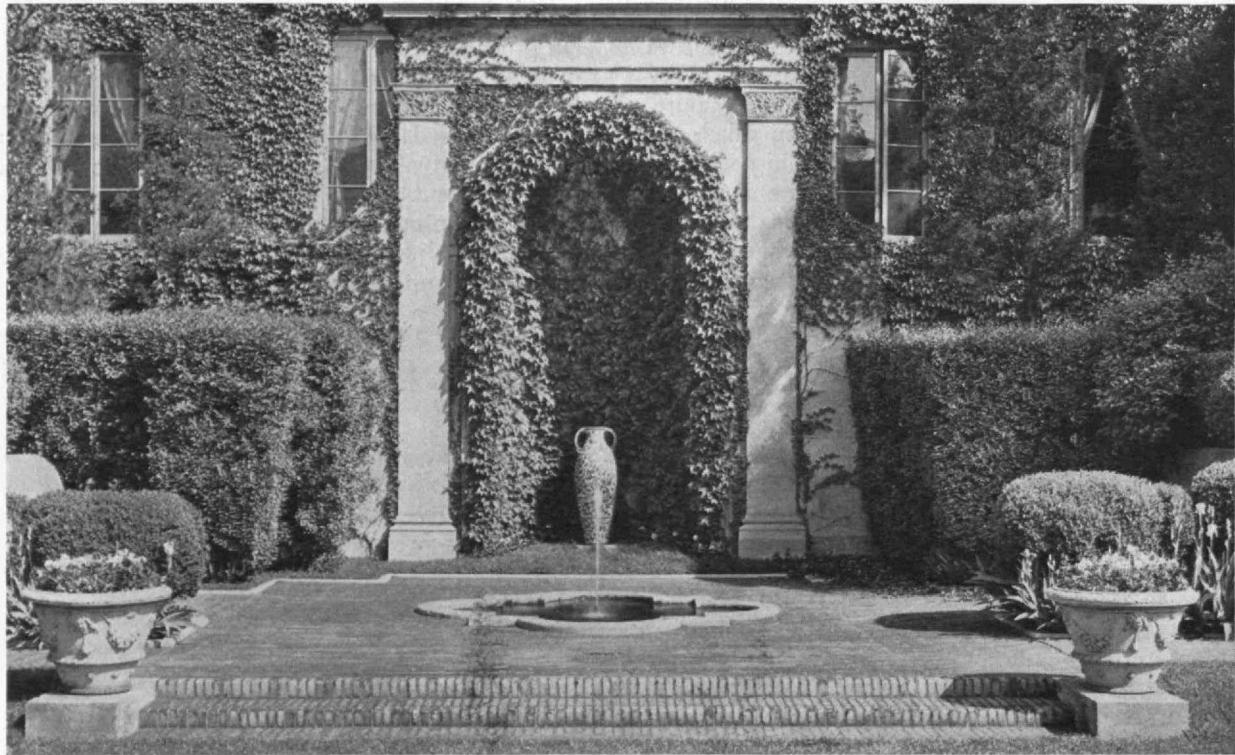
Yes 1,146 No 267 No vote 171

5. *Would you favor some other scheme of electing Term Members, such, for example, as that originally proposed and rejected because it was felt that it did not give true representation to the alumni at a distance, by which scheme the nominating committee was elected by the class secretaries and by the members at large of the present Alumni Council?*

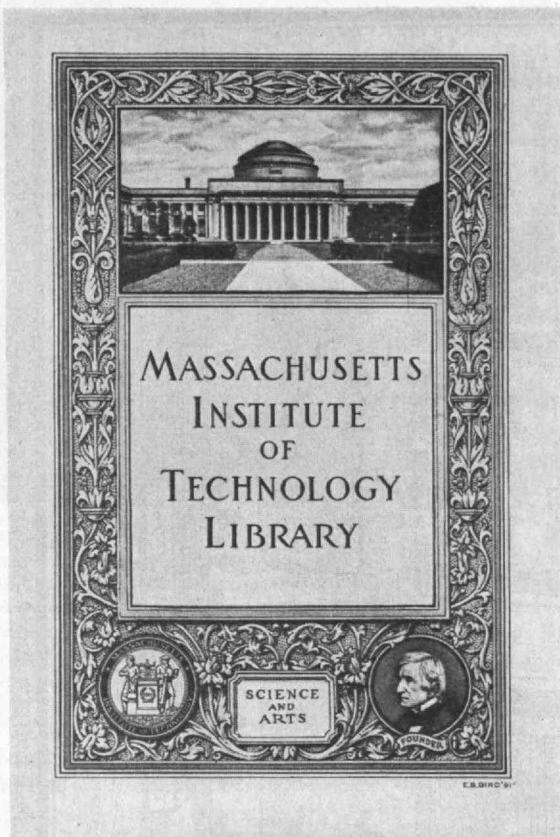
Yes 197 No 1,065 No vote 322

6. *Do you favor the proposal in the report for a full-time alumni director, who would coöperate with the administrative officers of Technology, whose salary would be paid in part by Technology, and who would make annual visits to the alumni clubs throughout the country?*

Yes 697 No 765 No vote 122



A spot in the garden of the President's house. M. I. T. has been awarded a bronze medal by the Trustees of the Massachusetts Horticultural Society for the planting in this garden



*Bookplate for the Institute's library, designed by Elisha B. Bird, '91, and donated by him to the Institute. Mr. Bird is President of the American Society of Bookplate Collectors and Designers and has executed many plates for American Universities*

7. Instead of this would you prefer an alumni secretary, as at present, to attend to routine matters and correspondence, and devote the extra money which would have to be paid to an able alumni director to defray expenses of trips by various members of the Technology staff to cover the country every year, and thus give you varied speakers and viewpoints instead of the same alumni director year after year?

Yes 828 No 591 No vote 165

8. Do you agree that The Technology Review is a highly representative alumni magazine and should be continued under its present system of control?

Yes 1,445 No 56 No vote 83

9. Do you favor the removal of the present distinction between graduates and non-graduates, making everyone a member of the Alumni Association who has registered at Technology and attended classes, unless he expressly desires not to be a member?

Yes 676 No 840 No vote 68

10. During the war many men attended the Army and Navy schools on the Technology grounds. They were not actually registered as Technology students, although we have the names in our files. Some of these have expressed a desire to join Technology gatherings and associations. Would you favor these men affiliating with our Alumni Association?

Yes 779 No 722 No vote 83

11. Are you satisfied with the way the local clubs function at present?

Yes 584 No 336 No vote 664

12. The present Alumni Council is the outgrowth of the Association of Class Secretaries. The Technology Clubs Associated was an outgrowth of the work of organizing the alumni. The meetings of this latter organization in recent years have not been well attended and many feel that it has outlived its usefulness. Do you favor abandoning the Technology Clubs Associated?

Yes 882 No 264 No vote 438

It is natural that The Technology Review should be particularly gratified by the vote of confidence it received in the answers to question eight.

### Ten Men in a Bus

IN A bus fully equipped for sleeping, cooking and long distance travel, ten Institute undergraduates made a six-weeks' tour of industrial plants this summer. They traveled as far south as Birmingham, as far west as St. Louis, and as far north as Canada, and the entire trip cost each man nine cents per day, plus \$14.00 for the khaki uniform which he wore. The trip was made possible by the Thorne-Loomis Foundation of New York, an educational venture sponsored by Landon K. Thorne and Alfred L. Loomis, President and Vice-President, respectively, of Bonbright and Company, Inc. Mr. Loomis, being a Life Member of the Corporation, made the bus available to the Institute, and Professor E. H. Schell, '12, assembled the group.

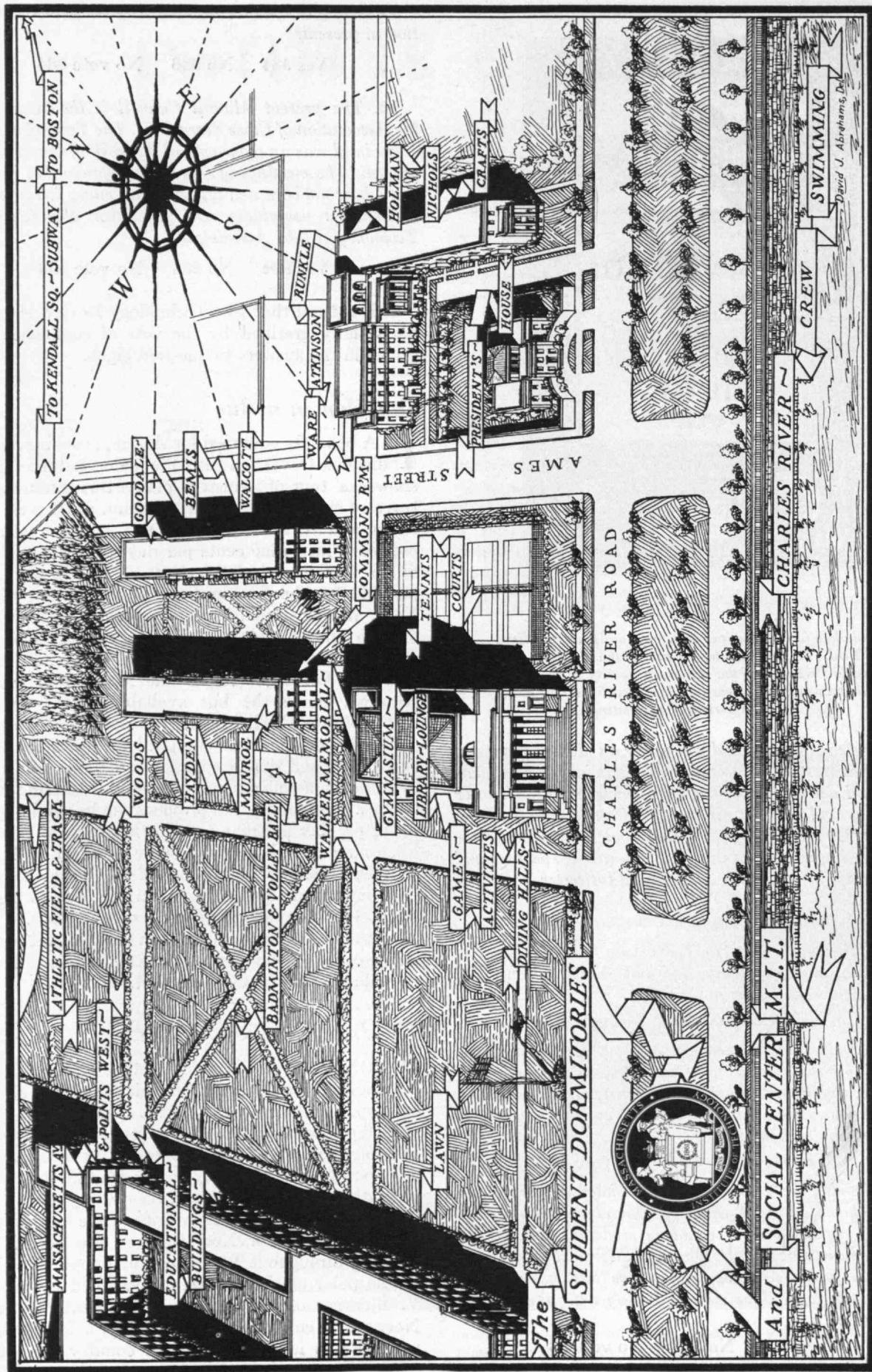
The Foundation has equipped 30 buses for similar expeditions and they are made available in the summer to students of colleges and members of banking organizations. The Foundation provides the bus and pays one dollar per day per man toward the traveling expenses. Each man is supposed to provide an additional dollar, but the total per capita cost of the Technology trip only amounted to \$1.09 per man per day, so that the net cost to the undergraduates was nine cents.

The ten men, living entirely in the bus and camping out, traveled 6,000 miles and visited 35 industrial plants, as well as points of scenic interest.

### The Institute Weather Man

A COMPREHENSIVE forecasting service, based on new methods of meteorological analysis, has been developed at the Institute as part of the work in the advanced course in meteorology given under the direction of Professor Carl-Gustaf A. Rossby. Synoptic weather maps are distributed daily to the United States naval air stations in various parts of the country and to European meteorological observatories, while local forecasts for Boston and for New England are posted every morning throughout Technology buildings.

The polar air front theory, sponsored by Professor V. Bjerknes of the Geophysical Institute of Bergen, Norway, is employed in Technology's forecasts. The method was introduced in this country for the first





*Professor W. Spannhake of the Technische Hochschule, Karlsruhe, Germany, to offer graduate courses in the theory and practical design of hydraulic machinery and to supervise graduate research work in this field at Technology, where his son will be a special student*

the invisible reservoirs which feed the "lows," the breeding ground of storms. These "lows" usually form along the boundaries between masses of air of different temperature, the cyclonic whirl of the "low" pressure area being fed on one side by warm air, and on the other, by air of a lower temperature. The length of storms depends to a great extent upon the supplies of warm and cold air in the opposing masses. Observations of the movement and extent of these great atmospheric reservoirs, therefore, make it possible to predict with a remarkable degree of accuracy when a storm is brewing and when its end may be expected.

The daily government observations on pressure, temperature, and wind direction are employed in making forecasts at the Institute, for from this information it is possible, under the polar front theory, to indicate the location and extent of the great air masses. Weather observations are broadcast by the government from Washington daily. This information is transmitted by a complicated code designed to minimize the risk of error. The information is received by radio at the Institute by two operators, who are also trained in interpreting the data.

While remarkably accurate forecasts can be made from observations at the present group of weather stations, additional information from certain localities not now covered would increase the efficiency of the work.

### Registration Forecast

WE AGAIN present an advance estimate of the Institute's registration for the academic year just opening as this issue goes in the mails. Registrar J. C. MacKinnon, '13, has prepared it, and last year when he made a similar forecast, it turned out that he was strikingly near the final figures.

After long, arduous meditation over the statistics he has in his possession, he makes the following report:

time by Professor Rossby, and is based on a study of the movements of vast masses of cold and warm air.

Weather maps issued at the Institute contain not only the conventional meteorological information, but show the outlines of these great oceans of warm and cold air, some of which are often a third the size of the United States. Thus the forecaster has before him a picture of

	Oct. 1, 1930	Sept. 30, 1931	Change
	Estimate		(%)
First Year . . . . .	737	690	-6
Second Year . . . . .	667	650	-3
Third Year . . . . .	599	590	-2
Fourth Year . . . . .	614	600	-2
Graduate Year . . . . .	512	490	-4
Unclassified . . . . .	58	60	+3
Total	3,187	3,080	-3

### Additions to Faculty

LAST July The Review recorded the new appointments to the instructing staff of the Institute for the current academic year, and at the same time it presented biographical sketches of a portion of the new appointees. We continue below the series of biographical sketches.

DR. WAYNE B. NOTTINGHAM, Assistant Professor in the Department of Physics, electrical engineer, and Scandinavian-American Fellow at the University of Upsala. After his fellowship he returned to America to join the research staff of the Bell Telephone Company and later was put in charge of certain developments at the Hawthorne Plant of the Western Electric Company. Following this he received his doctor's degree from Princeton on the basis of research on the properties of metallic arcs. Since then he has been a research fellow of the Bartol Foundation and has done notable work, first on arcs, and more recently on photo-electric phenomena, electron emission, and properties of metallic surfaces. He has at the same time been a consultant in the design of new apparatus involving amplifiers.

DR. PHILIP M. MORSE, Assistant Professor in the Department of Physics, graduate of the Case School of Applied Science, and recipient of a doctor's degree from Princeton. While there he published numerous papers, several of which were in collaboration with President Karl T. Compton, on theoretical interpretation and mathematical formulation of phenomena of discharges through gases. He is the author of several important theories dealing with the spectra, dissociation and energies of chemical molecules, and is co-author of the first book in English on wave mechanics. Last year he was at the University of Munich as an International Research Fellow.

JOHNSON O'CONNOR, as part-time Assistant Professor of Industrial Research in the Department of Business and Engineering Administration, graduate of Harvard University where he received his master's degree, and Fellow of the American Academy of Arts and Sciences. From 1913 to 1918 he was engaged in astronomical research with the late Percival Lowell, eminent astronomer, after which he did research work in metallography with the American Steel and Wire Company at Worcester. In 1920 he was on the electrical engineering staff of the General Electric Company, and later was put in charge of that concern's research in the psychological testing of aptitudes. At present he is engaged in an extensive research program of student testing in connection with Stevens Institute of Technology.

ALBERT A. SCHAEFER, as part-time Assistant Professor of Business Law in the Department of Business and

Engineering Administration, a graduate of Harvard University where he received his LL.B. Since 1913 he has been practicing law and is now a member of the firm of Ropes, Gray, Boyden, and Perkins, where he has specialized in the trial of cases involving commercial problems and in the receivership and reorganization of public service and mercantile corporations. He was at one time the New England Director of Enforcement for the United States Fuel Administration, and after the war he continued in a similar position during fuel emergencies in Massachusetts. He is a member of the American, the Massachusetts, and the Boston Bar Associations; and he has acted as advisory counsel for Harvard University and Technology.

COLONEL S. C. VESTAL, in charge of the Department of Military Science and Tactics and lecturer on international law, graduate of the United States Naval Academy, student at the Army Staff College in 1906, graduate of the Army War College in 1915, and graduate of the General Staff College in 1920. He has seen active service in the Spanish-American War, in the Philippines, and in the World War. Colonel Vestal is the author of "The Maintenance of Peace," and numerous articles on military and international affairs.

RALPH E. FREEMAN, Associate Professor of Economics, graduate of McMaster University in Canada, and winner of a Rhodes Scholarship. He carried on graduate studies at Balliol College, Oxford, and for two years at the University of Chicago, where he was granted a fellowship in the Department of Economics. For six years he was head of the Department of Economics and Political Science at the University of Western Ontario. He is the author of "Economics for Canadians," published in 1928. In addition to his teaching, Mr. Freeman has had valuable experience in business, being at present research assistant to Cyrus S. Eaton of Otis and Company, Cleveland, Ohio.

### *Dr. Tryon's Trips*

IN ORDER to cultivate closer relations between the colleges and universities from which students transfer to the undergraduate courses of the Institute or enter its graduate department, Professor James L. Tryon, Director of Admissions, has spent part of his time during the past five years in visiting institutions of higher education in the United States and Canada. The first year he visited in the Eastern states, the second in the Southern states east of the Mississippi, the third in the Southwest, and the fourth in the Central West and Canada. This year he is visiting the Pacific Coast.

Local appointments with Technology Clubs and groups have been arranged for him by Professor Charles E. Locke, '96, Alumni Secretary. The local clubs coöperate with him by arranging a program of visits among high and preparatory schools, as well as, in some cases, colleges that are located in their centers. The clubs usually hold a luncheon at which Dr. Tryon speaks on the news of the Institute and brings them up to date on its policies.

When he is invited to speak in a school he ordinarily takes for his topic "The Education of an Engineer," by means of which he explains in popular language how

the American system of engineering training is organized, what its prerequisites are, and the careers to which it leads. In an address at an arts college he speaks on the relation of a liberal arts education to engineering or advanced scientific training. He illustrates his talk by the fields of study offered at the Institute. At an engineering school he meets seniors who are desirous of coming to the Institute for graduate work and who need advice as to the procedure of applying for admission, or information in regard to graduate courses and scholarships. One of his main objects in meeting the college men or engineering students is to enable them to enter the Institute with the least expenditure of time and money on their part by advising them as to the choice of subjects to be offered for credit, or the making up of deficiencies.

During his tours Dr. Tryon has interviews with parents of students with whom he has previously had correspondence, and clears up their doubts concerning entrance questions. He often selects a preparatory school in which students, who are only partially fitted, may complete their preparation. On several occasions he has addressed faculty groups on "Recent Tendencies in University Education," giving them the benefit of observations made in his travels. He has several invitations to speak on this subject on his far-western journey.

On his return from a trip it is his custom to summarize his impressions of other institutions in a report to the administrative officers and heads of Institute courses, as well as to a Faculty committee on publicity of which he is the Secretary. His visits among the colleges and universities were projected by Dr. Stratton as a means of rendering service to incoming students and of fostering cordial relations with sister institutions; they are now authorized by President Compton who has himself lately visited among the alumni and several educational institutions on the Pacific Coast.

Dr. Tryon's itinerary follows:

#### MONTANA

- Oct. 15 — Bozeman — Montana State College
- Oct. 19 — Butte — Montana School of Mines
- Oct. 19 — Butte — Montana Society of the M. I. T.
- Oct. 20 — Missoula — University of Montana

#### WASHINGTON

- Oct. 22 — Spokane — Gonzaga University
- Oct. 22 — Spokane — Inland Empire Association of the M. I. T.
- Oct. 26 — Pullman — The State College of Washington

#### IDAHO

- Oct. 27 — Moscow — University of Idaho

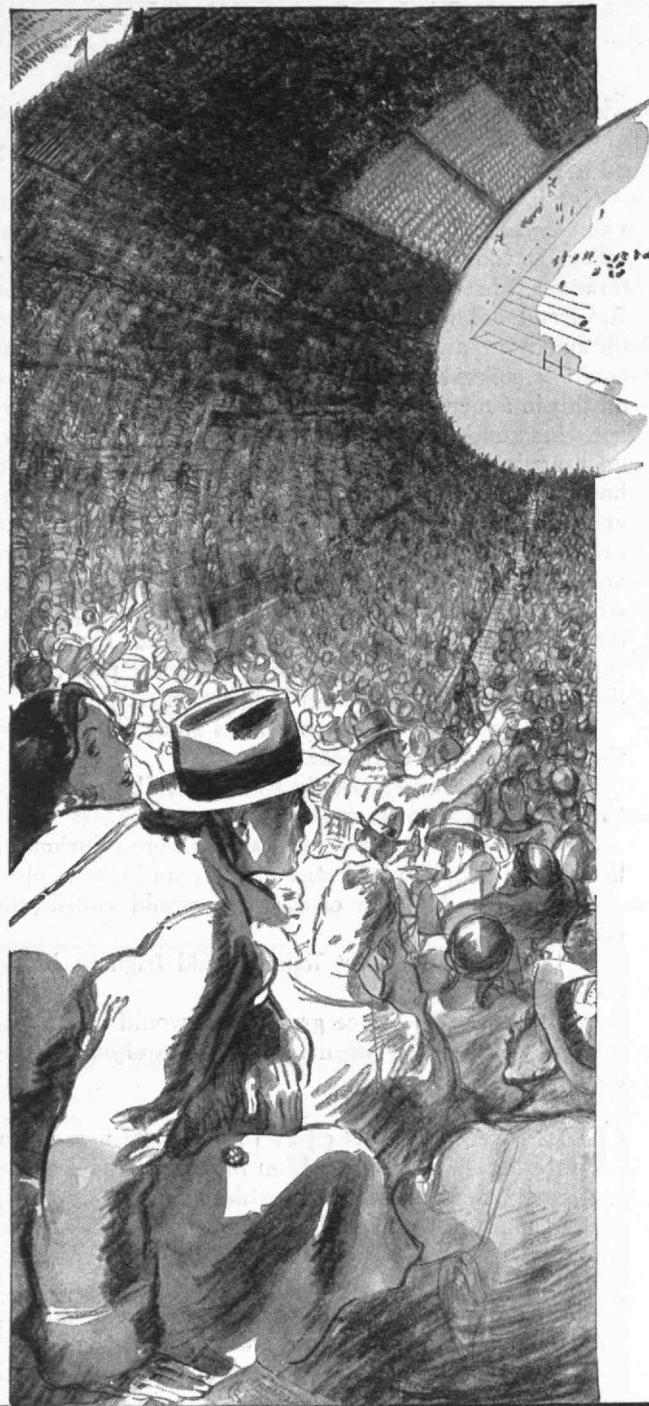
#### WASHINGTON

- Oct. 29 — Walla Walla — Whitman College
- Oct. 31 — Seattle — Technology Club of Puget Sound
- Nov. 2 — Seattle — University of Washington
- Nov. 4 — Tacoma — College of Puget Sound

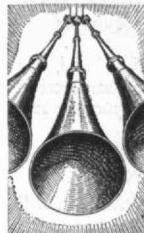
#### OREGON

- Nov. 6 — Portland — Reed College
- Nov. 6 — Portland — Technology Association of Oregon
- Nov. 10 — Salem — Willamette University

(Continued on page 46)



## Back-seat blues ..now ended



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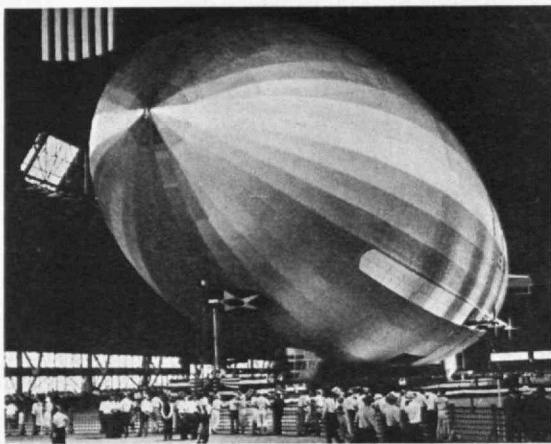
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E. S. Coldwell - - '15

S. J. Cole - - - '26

J. A. Emery - - - '93

Page Goisan - - - '12

J. F. Greene - - - '07

F. K. Merriman - '04

G. I. Rhodes - - - '05

A. A. Uebelacker - '18

R. P. Westerhoff - '27

H. E. Whitaker - - '09

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## NEW LAMPS FOR OLD

(Continued from page 12)

with oil, Drake's Folly became, overnight, the wonder and envy of the country-side, and a wild stampede for oil began.

Gas is now recognized as the fuel of highest form-value because of its cleanliness, convenience, and adaptability. It took the world much more than a century, however, to recognize the obvious. As early as 1688 the Reverend John Clayton heated coal in a retort and obtained tar and gas. He demonstrated that the gas could be collected and stored and burned. He published all this in a memoir which few noticed and everyone forgot. One hundred and fourteen years later William Murdoch again made gas from coal and with it lighted his house at Redruth, Cornwall. Furious opposition was aroused when Murdoch and his associates attempted to extend the use of gas. Scott, Byron, and Napoleon were among those who ridiculed the crazy notion. Scott wrote, "There is a madman proposing to light the streets of London with — what do you suppose — smoke?" In 1816 an influential German paper condemned the project of street lighting on six points:

1. Theological — as blasphemous since God divided the light from the darkness.
2. Judicial — since people should not be compelled to pay for gas they do not want.
3. Medical — since the emanations were injurious to health and people would stay out late and catch cold.
4. Moral — The fear of darkness would vanish and crime would increase.
5. Police — The street lights would frighten horses and embolden thieves.
6. Economical — since great sums would be sent to foreign countries — presumably for equipment and coal.

THE inventor, in his effort to exchange new lamps for old, has commonly been forced to travel a long and rocky road through a hostile country. You may recall the story told by Petronius of the artisan who brought to Nero a superb goblet and demonstrated that it was made of glass as malleable as metal. The goblet excited the admiration of the Emperor and his court, but when Nero had ascertained that the artisan alone knew the secret of its manufacture he ordered his head struck off that the gift might remain unique.

Fortunately, few inventors have suffered a like fate, but it is also true that few have had the value of their offering so promptly recognized.

Toward the close of the Eighteenth Century the social structure of England was radically reorganized by the Industrial Revolution. It created many serious problems for which the world is still seeking the solution. It was the resultant of so many forces that no single formula suffices for its explanation. It is, however, commonly ascribed to the appearance, within a brief period, of a number of remarkable inventions, most of which had some direct relation to the textile industry.

When the great engineer, Smeaton, first saw Watt's steam engine at work, he said, "It is a very remarkable invention, but notwithstanding (Continued on page 38)

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## NEW LAMPS FOR OLD

(Continued from page 36)

its excellence it can never be brought into general use because of the difficulty of getting its parts manufactured with sufficient precision." By the untiring patience and effort of Watt and his associates these obvious difficulties were, however, sufficiently overcome to enable the engines to drive the new machinery, which other inventors provided for the cotton mills.

In 1791 the French chemist, Le Blanc, invented a process for making caustic soda and sodium carbonate from common salt, thus giving the world for the first time a cheap and abundant supply of alkali. He started operations in a factory which was soon thereafter confiscated by the Committee of Public Safety. As a most deplorable consequence Le Blanc died by suicide in a French poorhouse. Fortunately, his process long outlived him and became the foundation of the great British alkali industry with its many ramifications and by-products.

Stephenson's locomotive, which was going to lower the price of oats, and which was preceded by a man carrying a red flag; Fulton's steamship and Ericsson's "Monitor" were all objects of ridicule to their contemporaries, although Lincoln's comment when shown a model of the "Monitor" was, "I think there's something in it," as the pretty girl said when she drew on her stocking."

In 1804 the British Admiralty declared it their duty "to discourage the employment of steam vessels as . . . the introduction of steam vessels was calculated to strike a fatal blow to the naval supremacy of the Empire."

When, in 1815, Samuel Baldwin Rogers realized the great proportions to which the English railway system was destined to expand, he submitted to prominent engineers detailed plans for the construction of one thousand miles of railroad. He was laughed at. He was called "a dreamer." His suggestions were those of a "madman" and impossible of adoption. Yet before Rogers died he had seen between four and five thousand miles of rail laid down.

Here, in America, we have, upon the whole, been kindly disposed toward inventors. They have in general fared better with us than saints have fared elsewhere in the world, but our recognition of them has often been strangely and long delayed. Samuel F. B. Morse conceived his telegraph in 1832. He struggled for 12 years in extreme poverty before the Washington-Baltimore line was built, though he had demonstrated his system in 1837, and during that long period he was rebuffed and ridiculed.

Charles Goodyear was another martyr to a great discovery. In 1830, when Goodyear set out to improve them, the "gum shoes" and other clumsy goods made of raw rubber had little to recommend them. They softened with heat, were often sticky, and always liable to mildew.

For ten years of dire poverty Goodyear tried every conceivable way to overcome these fatal objections and convert rubber into a material of broad utility. At last, in 1839, he had the happy accident which revealed to him the process of vulcanization (Continued on page 40)

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### NEW LAMPS FOR OLD

(Continued from page 38)

as he picked up the little ball of rubber and sulphur which he had inadvertently dropped on the hot stove. It was two years more before anyone could be induced to back the discovery with money. He was harassed by patent suits. He tried unsuccessfully to introduce the invention in England. The French company which he did form failed, and Goodyear was imprisoned in Paris for debt. He died a poor man in 1860 in New York. Let us hope he returned to Paris thereafter.

Coming down to our own contemporaries, we find Selden, the inventor of the gasoline-propelled automobile, striving vainly for years to interest capital in the building of his "horseless carriage." His proposals were received with scoffing and derision. Although his application was filed in 1879, it was 16 years before he could secure its allowance as a patent, and, to enforce his claims, he was, thereafter, involved in long and expensive patent litigation. All in all, it is doubtful if Selden received a return of as much as one cent a car from the automotive vehicles in which his invention has been embodied, though out of every family dollar 11 to 12 cents is spent for motor cars.

We are pleased to believe today that we know a good thing when we see it, but Charles F. Kettering, President of General Motors Research Corporation, tells us that he has to pick good ideas out of the waste basket at least six times before he can secure their adoption.

Ever since the wax melted in the wings of Icarus as he soared toward the sun, proposals for human flight have been received with suspicion and distrust, which, in these later days have been intensified by the fate of Darius Green and his Flying Machine. It is, perhaps, not surprising, therefore, that Langley, who attacked and solved many of the problems of aeronautics as a scientist, died humiliated and crushed by public disdain; that Wilbur Wright during the days of preparation for his amazing flights at Paris was caricatured as "*Le Bluffeur Wright*," or even that the nation's idol, Lindbergh, was once called "The Flying Fool."

It would be an interesting study to trace the origin of old prejudices. When I was a boy many old people believed that tomatoes caused cancer. Today the tomato and its frequent associate, lettuce, are recognized as among the most important sources of the vitamins A, B, and C, which are so essential to nutrition and health.

The introduction of the potato in Europe met with great resistance, and the controversy was raging 150 years ago. Cobbett in England asserted that anyone who advocated their cultivation was not a patriot. The small farmers and peasants had often to be bribed before they could be induced to grow and use potatoes, so hard is it to change agricultural and food habits.

It might be supposed that the importance of pure food would be recognized, even by Congressmen, without argument. Dr. Harvey W. Wiley learned otherwise. The first pure food bill was introduced in Congress in 1889. Others followed at frequent intervals, but for 17 years their passage was prevented. Not until 1906 did Dr. Wiley win his fight and the President sign the Food and Drugs Act.

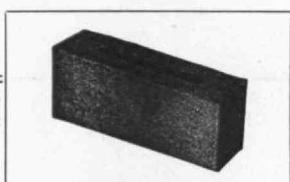
(Concluded on page 42)

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## NEW LAMPS FOR OLD

*(Concluded from page 40)*

Although prejudice and fundamentalism still shackle thought in many fields and great peoples are still encased in the shell of habit and custom, the world is now undoubtedly more tolerant of new ideas than in the past. The public, bewildered by the magic of the laboratory, is even too ready to accept any marvel from science, however inaccurate its sensational presentation in the press may be.

Invention, on many lines, is now an organized industry conducted in the research laboratories of great corporations whose executives are alert to utilize each new development. The solitary inventor, nevertheless, still travels painfully and far to exchange his lamp. He, or his friends, must provide the money for development before he can show that "basis for credit and record of earnings" which High Finance demands.

In reviewing the difficulties surrounding the exchange of new lamps for old, one is forced to the conclusion that Authority, if not indeed blind, like Justice, is at least myopic. With monotonous repetition the new has been rejected by those presumably best qualified to appraise its worth. Far too often has their decision been confirmed by ignorance and self-interest. Caution and conservatism have their place and value, but they would hold us where we are. Progress comes only through imagination sustained by faith. Fortunately, great ideas live on through many reincarnations and ultimately prevail.

We, ourselves, are living in a time of ferment and upheaval when it is more necessary than ever before to "prove all things; hold fast that which is good." Let us then conduct our proving with an open mind lest that which is good escape us, and if we ourselves are privileged to carry a message of truth and leading let us say, with Browning, in "Paracelsus":

"I press God's lamp  
Close to my breast; its splendor, soon or late,  
Will pierce the gloom: I shall emerge one day."

## SLIDE RULE CIVILIZATION

*(Continued from page 14)*

politics that has been so fruitful in the physical world. The fact instead of the opinion type of mind, the engineering attack based on whatever we can discover in the way of a social slide rule seems the only logical way to proceed.

One of our greatest problems is to train more experts and to learn to depend upon them. Our margins as a people have been reduced by our geographical spread. It is so natural for each of us, particularly if built on the American plan, to think that we can operate freely and successfully under our own impulses and through our own capacities. There are certain hidden forces in the way in which we behave which are unknown to us. Undoubtedly, much of what we call economic law is based upon mass human behavior. When I watch some of those who have fixed opinions as to just what we should do in handling our problems of organization, government and civilization, *(Concluded on page 50)*

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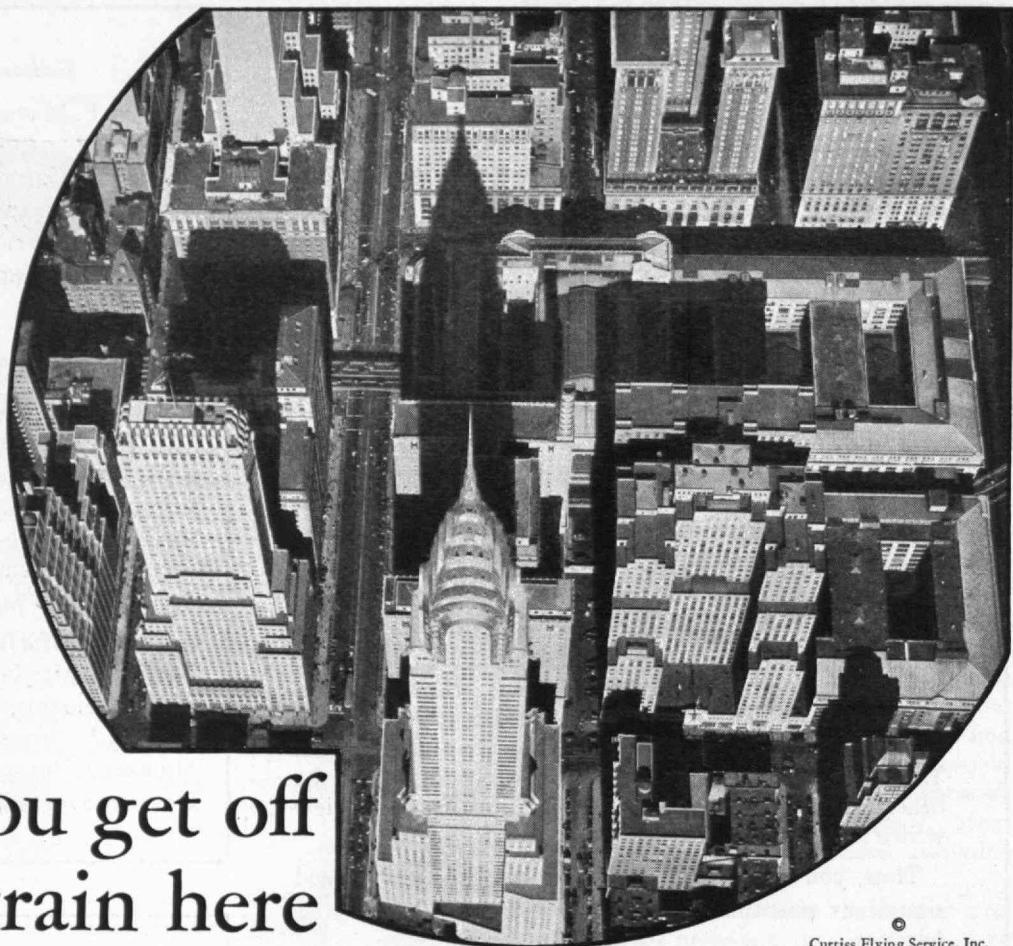
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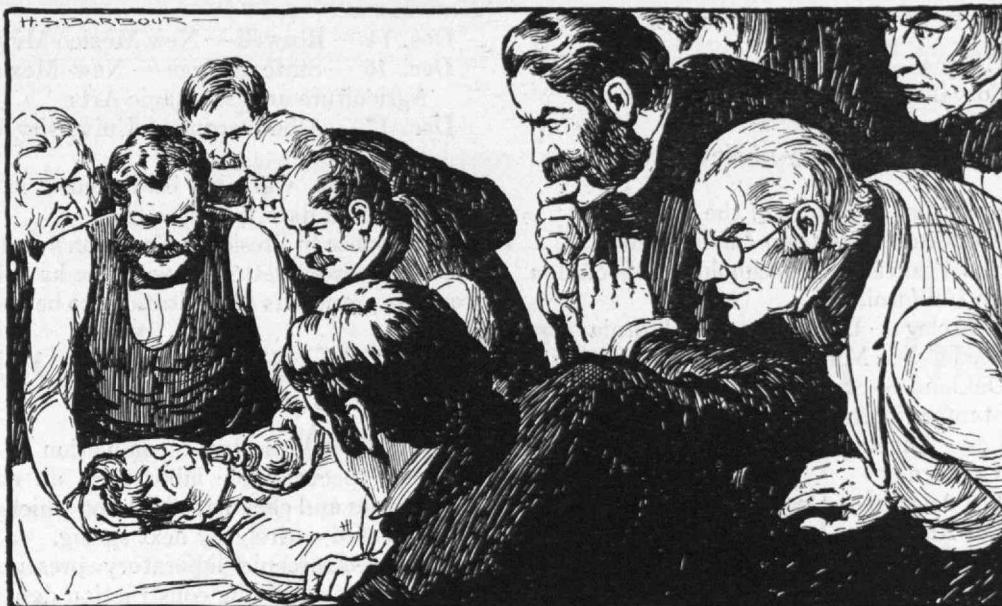
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# The Painless Operation

An advertisement  
written for TIME by  
Miss Catherine P. Harris  
Junior League of Boston.



... High up under the dome of Boston's Massachusetts General Hospital, far removed from the wards so that the screams of sufferers under the knife will not horrify the ward patients, is the Hospital's famed operating amphitheatre. Many a medical student dreads the operations he is privileged to watch, frequently faints. But one day last week Dr. John C. Warren, Boston surgeon, led a group of surgeons and students (class of 1847) up the long stairs, eager, hurrying.

For there beckoned an interesting experiment—surgery without pain. Dr. William Thomas Green Morton, 27-year old Boston dentist, thought it possible, had experimented to that end with ether, a volatile, pungent chemical compound capable of producing insensibility. He had tried it on animals, on himself, then on his patients while extracting the roots of decayed teeth. Finally he had obtained permission from Dr. Warren to let him test his drug before an audience. One Gilbert Abbott, with a tumor on his neck, was to be the first trial.

At 11 a.m. the last privileged student hurried into the amphitheatre. Experimentee Abbott, fidgeting on the operating-table, looked anxiously at the clock. Casual talk ceased, sudden silence prevailed as the minute-hand crawled past the hour, and Dr. Morton did not appear. "He and his anesthetic! Humbugs both, no doubt!" mumbled a doctor. It became five minutes past eleven, ten, then a quarter after. The patient stirred uneasily, Dr. Warren selected an instrument, advanced to the table—useless to delay proceedings any longer. As his knife poised for the incision, Dr. Morton, breathless, apologetic, rushed in. He held in one hand a curious globe-and-tube apparatus.

In eager concentration, tensely expectant, the waiting group of surgeons and students watched while the newcomer—a charlatan perhaps, a genius possibly—adjusted his peculiar inhaling apparatus to the patient's mouth and with tense composure administered

his anesthetic. Veiled skepticism revealed itself when the patient reacted suddenly in wild exhilaration, but this exuberance subsided, relaxation took its place, then unconsciousness. Skepticism was routed, amazement paramount. Said Dentist Morton to Surgeon Warren: "Your patient is ready."

Dr. Warren began to operate, proceeded quickly, in five minutes had finished. From the patient came no cry of pain, no agony of distress, only slight movements, mumbled words as from one who stirs on the borderland of sleep....

"This, gentlemen," exclaimed Surgeon Warren, "is no humbug."

Awake, Gilbert Abbott said, "I felt no pain."

So, in part, had TIME been published in October, 1846, would TIME have reported the first public demonstration of ether as a surgical anesthetic. So, too, would TIME have reported how one Dr. Crawford Williamson Long, of Georgia, came forward later saying that he had used ether four years previous, had given it up as impractical.... So, too, would TIME have reported the bitter persecution that came to Dentist Morton when he patented his discovery as "Letheon"; the seizure of "Letheon" by the U. S. Government for its own uses; the claims of Dr. Charles T. Jackson, the Boston chemist from whom Dentist Morton had obtained his ether; the division of the Paris Academy of Medicine's 5,000 franc Monthyon Prize for 1852 between these two, with Morton proudly refusing his share; the long Congressional investigations resulting in nothing, and Dentist Morton's death in poverty in 1865.

Cultivated Americans, impatient with cheap sensationalism and windy bias, turn increasingly to publications edited in the historical spirit. These publications, fair-dealing, vigorously impartial, devote themselves to the public weal in the sense that they report what they see, serve no masters, fear no groups.

# TIME

*The Weekly Newsmagazine*

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## INSTITUTE GAZETTE

(Continued from page 34)

- Nov. 11 — Eugene — University of Oregon  
 Nov. 13 — Corvallis — Oregon State College
- NEVADA**  
 Nov. 16 — Reno — University of Nevada
- CALIFORNIA**  
 Nov. 19 — Stockton — College of the Pacific  
 Nov. 20 — Modesto — Modesto Junior College  
 Nov. 23 — San Francisco — Technology Association of Northern California  
 Nov. 23 — Berkeley — University of California  
 Nov. 24 — Oakland — Mills College  
 Nov. 24 — Oakland — St. Mary's College  
 Nov. 24 — Stanford University — Stanford University  
 Nov. 30 — Los Angeles — Technology Club of Southern California  
 Nov. 30 — Los Angeles — Occidental College  
 Nov. 30 — Los Angeles — Loyola College  
 Nov. 30 — Los Angeles — University of Southern California and the University of California at Los Angeles  
 Dec. 2 — Pasadena — California Institute of Technology  
 Dec. 3 — Redlands — University of Redlands  
 Dec. 4 — Claremont — Pomona College
- ARIZONA**  
 Dec. 8 — Phoenix — Phoenix Junior College  
 Dec. 9 — Tucson — University of Arizona

### TEXAS

- Dec. 11 — El Paso — State School of Mines and Metallurgy (Branch of University of Texas)

Dec. 11 — El Paso — Technology Group

### NEW MEXICO

- Dec. 14 — Roswell — New Mexico Military Institute  
 Dec. 16 — State College — New Mexico College of Agriculture and Mechanic Arts

Dec. 17 — Albuquerque — University of New Mexico

Denver, Colo., will also be included in Dr. Tryon's itinerary on a date yet to be fixed.

In response to President Compton's announcement of this tour, cordial letters of welcome have been received from the presidents of institutions to be visited all along the way.

### The New Buildings

LATE fall will mark the completion of Technology's new spectroscopic laboratory, an adjunct of the new physics and chemistry building which will probably be completed entirely by next spring.

The spectroscopic laboratory presents many new innovations in building construction designed as it is to fulfill the demand of physicists desirous of carrying on experiments of unparalleled delicacy in the study of light. The primary requirement has been to construct a building as nearly vibration-free as possible and to protect the supersensitive instruments which are to be placed within from jarring or shock. So well have the builders met this specification that a large metal mirror suspended at the end of a lever (Concluded on page 48)



M. I. T. Photo

*The new physics and chemistry research group. In the far corner of the inside court formed by the new physics and chemistry building may be seen the spectroscopic laboratory, described above. It is practically completed, although, as can be seen, the main building is still in the early stages of construction*

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## INSTITUTE GAZETTE

(Concluded from page 46)

35 feet long is not expected to quiver so much as one-twenty-five thousandths of an inch.

The rooms in the spectroscopic laboratory, the largest 45 feet by 45 feet, are built like the box of a camera: light-tight, windowless, and air conditioned. In fact all air drafts and temperature fluctuations, both serious menaces to experimental accuracy, are completely eliminated.

As can be seen in the photograph on page 46, this unusual structure occupies a site entirely surrounded by other buildings, the heavy foundations of which serve to protect it from many of the earth waves beating in the adjacent highways and industrial plants.

"Precast concrete piles driven through the deep underlying mud, some of them slanting to prevent lateral vibration, support first and second concrete floors each three feet thick. Built up on the concrete base is a special isolated floor made of layer upon layer of fine, round sand, calculated to absorb vibrations entering on a horizontal plane. Asbestos board and concrete are interlaid for structural support, and a heavy sheet of cork serves to negate vertical shocks. As though this were not enough, the designers have taken the final precaution of mounting the most delicate instruments on special concrete pillars.

"The walls and roof of the laboratory are built on outer wooden piles of their own, serving merely as housing around the workrooms. At no point do they touch the rigid floor foundation. Any intervening gaps between second floor partitions and the roof are chinked with felt, which deadens any vibration that might otherwise be communicated to the heavy groundwork.

"The outer walls at the first floor are over four feet thick, composed of brick, eight inch cork, air space, and concrete. A thick layer of cork covers the entire building. An electric heating system with thermostat control maintains a temperature at no time varying more than a tenth of one degree from 68° F. in the experimental rooms, while an automatic air conditioner guarantees a year-round humidity ranging between 35% and 45%.

"A central corridor, carefully insulated from the adjoining workrooms, forms the nucleus of the structure.



M. I. T. Photo

*Showing the wall construction of the spectroscopic laboratory. The heavy insulation of cork can be seen being enclosed by a brick curtain*

It is entered from the physics and chemistry building, another unit now being added to the Institute group, through a series of three doors, carefully designed to minimize dangerous drafts and temperature variations. As a final protection against extremes of weather, an umbrella roof made of steel will cap the entire building."

The main research building to be devoted to both chemistry and physics, is over 300 feet long, 60 feet wide, and will contain four stories plus basement. It will include a well-equipped shop for the construction and maintenance of the delicate instruments used in research; a spacious lecture room; and a joint library and reading room for the use of the staff and students of physics and chemistry. The research rooms have been designed to permit the greatest flexibility in arrangements for future requirements. The construction specifications call for a structure of unusual rigidity with foundations of heavy reinforced concrete.

The supervising engineers for the physics and chemistry building are Stone and Webster, Inc. (Charles A. Stone, '88, and Edwin S. Webster, '88); the designing engineers for the spectroscopic laboratory are Chas. T. Main, Inc. (Charles T. Main, '76 and Charles R. Main, '09); the contractor for the construction work has been in the hands of the Scully Company (Frank P. Scully, '15); and Coolidge and Carlson (Harry J. Carlson, '92) are the architects.

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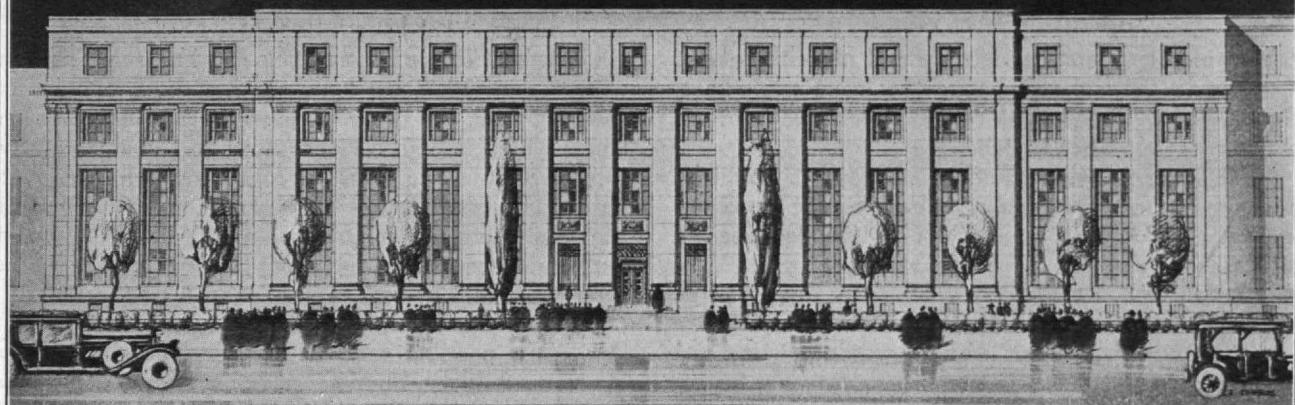
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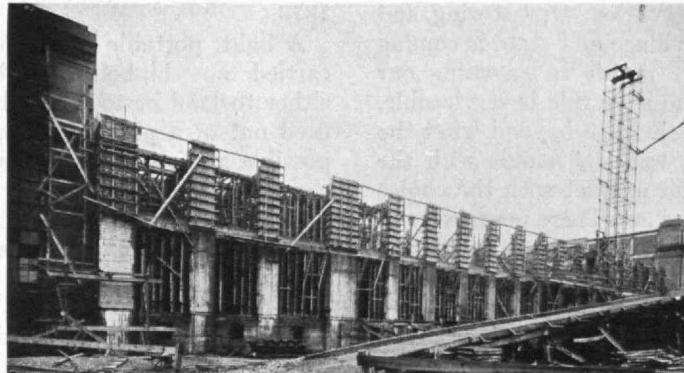
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## Chemistry and Physics Laboratory Building Superstructure and Masonry

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CAMBRIDGE

FRANK P. SCULLY '15, Treas.

Established 1865

GEORGE T. ROONEY '15

## SLIDE RULE CIVILIZATION

(Concluded from page 42)

and are able to write attractively and plausibly about it, I wonder if they have done the basic work upon which sound, social engineering stands, or in fact, whether anyone has yet done it.

While I am not trained as an engineer, it would be possible for me to write a fine-appearing book on bridges. I could give the history of bridges, describe the different varieties, the different materials of which they are constructed, the streams which they cross, and illustrate the books with correct and attractive pictures. Nevertheless, even though the book was interesting and erudite, I would advise no one to cross over a bridge built by me for I have no knowledge of the mathematics of the stresses and strains of materials. We have, unfortunately, too little accurate knowledge of the stresses and strains in our economic structure and in society in general. There is a whole world of unknown facts which must be discovered and set in order to approximate in the field of human action the advance made by the user of the slide rule in the physical world.

Man is by no means satisfied by mathematics or by facts alone. There is something in his make-up that demands emotional satisfaction. The evolution of architecture and its unfolding of beauty shows the effect of man's imagination upon structure. With this so-called mechanistic and material civilization, which is said to have come to a peak in our United States, we find, nevertheless, at this moment great national interest in the protection of the beauty spots of the nation, the national parks. Even though we have had an era of rapid exploitation of our natural resources, we find this followed by a desire for conservation. Our storing and protecting instinct in every village and state is coming into play. The make-believe in life is leavening our thoughts and our action. The slide rule is serviceable, but not satisfying. We all seek to go beyond what the facts will give us. We want to touch hands with the sculptors of all ages. We want contact with the choice minds of literature, music, and art. There never were so many flower gardens in America before. Beauty calls on us to clean up the edges of our highways. We are getting back to the Druids in our attitude toward trees.

The division of labor that goes on among the colonizing insects and within the cells of the human body is also a part of our living together. For this needed specialization of groups and of individuals we must depend upon our great educational institutions. They must attract, discover, develop, protect, and put into use those who are able to do the jobs that must be done. Our lack of uniformity is the basis of progress. The very fact that each person is independent, that each one can be a self-starter, will, I hope, encourage everyone to add something to the knowledge already within our scope. But whether we can do so or not is perhaps less important than that we should add our share, the share of a trained and educated man, to the lift on the human race that is necessary if we are to continue our advance upward. An educated man, if he was worth educating, always has margins of time and thought for his community and country.

## REACTION PROPULSION

(Continued from page 20)

Rheinhold Tiling of Osnabrick has had some success with two model rocket bodies he has designed, one for carrying mail, the other for passengers. The latter has wings which remain closely folded to the sides of the rocket body while it is in flight but which spread automatically as soon as the rocket stops, transforming the whole to a glider. In trial flights of his model it performed beautifully, returning to earth in a slow glide after the rocket had spent itself.

**I**F THE possibility of driving airplanes by rockets seems dubious, there nevertheless remain other uses for jet propulsion. Roy suggests high speed torpedoes, and there are still marine engineers who tinker with hydraulic jets. When the "Squirt," referred to earlier in this article, was tested, direct comparisons were made with a boat similar in detail, but driven by a screw. The jets were found to be more efficient than the screw, but the centrifugal pump of the jet was sufficiently less efficient than the engine driving the screw as to make the over-all efficiency much less than the screw-driven boat. The jet-driven boat was easy to maneuver and had advantages for shallow water. This latter fact led the British to begin the adaption of two trawlers for jet propulsion during the World War, but the coming of the Armistice stopped their construction.

At present, powder propulsion is most effectively employed in the form of life-saving, or line-carrying rockets. It has been estimated that the rocket stations manned by the British coast guard have been instrumental in saving between 12,000 and 13,000 lives since 1870.

A light, portable apparatus has been devised to be carried on shipboard, enabling lines to be thrown either to land or to other ships, a steel rocket that is fired out of a pistol with an enlarged barrel, making possible a fairly accurate aim. A six-pound rocket will carry a one-inch hemp line a distance of 350 yards. It is possible that these rockets will soon be required as part of the safety equipment of every ship, just as radio is today.

**W**HEN it was discovered that a rocket in its flight is not dependent upon a circumambient element such as air, men leapt to the conclusion that it would travel not only into the stratosphere, but into the emptiness of interstellar space. Professor Ziolkowsky sponsored an International Congress for Space-Travel the while Professor Oberth was gathering kindred souls into his *Verein Für Raumschiffahrt* (Club for Aviation in the Universe). America, too, joined this proliferation with the American Interplanetary Society, curiously enough an offspring of the American Museum of Natural History. In English the word *astronautics* has been coined; in German, *kosmonautics* has come into use.

Since time immemorial man has dreamed of "violating the virgin azure," but scientific literature on the subject is confined to very recent times. In 1913, Robert Esnault-Pelterie, the great French engineer, delivered a mathematical paper on (Concluded on page 52)

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**REACTION PROPULSION**

(Concluded from page 50)

astronautics before the St. Petersburg Academy, and in 1918 Professor Goddard published data supporting the practicability of a rocket flight to the moon. Speculation as to when and how it is to happen has already been pretty thoroughly indulged in by the Sunday supplements of newspapers and by the super-popular scientific magazines that deal, without hedging, in scientific futures. I leave the matter in their hands, with the fervent wish that they may, despite their vainglory, be right. If someone does reach the moon, I am sure he will find Cyrano there to greet him, to embrace him joyously, and to give him an autographed copy of "L'Histoire Comique des États de la Lune."

**ENDOCRINE THERAPY**

(Continued from page 17)

and has yielded—facts of real moment, much larger quantities must be obtainable before the molecular constitution can be determined and proven. A striking illustration of this is found in the isolation of thyroxin, an active derivative of the thyroid gland, by Kendall in 1914 and the proof of the formula by Harington in 1926, the latter having elaborated a method of preparation from natural sources which gave relatively large amounts (35 grams) for study.

With the constitution proven, the ultimate synthesis of the active principle is but a matter of time. While it is true that the completion of this chemical programme does not intrinsically offer a final solution of the three major problems stated above, it must be regarded as a tremendous step forward.

Suprarenin (adrenalin) was the first of the hormones to be prepared synthetically, and this was in 1900. The material from natural sources is one of two optical isomers; its complementary molecule has the same physiological action but in definitely less degree. As synthesis produces the racemic mixture, the artificial substance today probably constitutes no more than one-tenth of the total amount used in this country. At the same time, one company alone absorbs approximately 60% of the yearly production of adrenal glands in the United States in the manufacture of suprarenin. Any significant increase in demand would, of necessity, stimulate production of the synthetic product and stabilize the cost to the consumer.

Thyroxin, already mentioned, is the second hormone which has been produced by synthesis. The status of this latter is scarcely as well established as is that of suprarenin as the former is probably no more than an active principle of the thyroid naturally occurring as a portion of a larger molecule which is the natural form as synthesized by glandular activity. However, it possesses definite physiological activity and finds definite and valuable use in current treatment of thyroid failure.

There are today certainly not less than 15 active principles, the efficacy of which has been proved but the chemical nature of which is (Concluded on page 54)

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## ENDOCRINE THERAPY

(Concluded from page 52)

entirely obscure. If one may recapitulate briefly, the synthesis of these — and possibly many others of which we have no certain knowledge today — will aid in the solution of the three major problems as follows.

They will resolve the question of identity or similarity of certain hormones now drawn from widely different sources.

They will permit the administration of accurate dosage, a matter of vital importance when dealing with agents of such rigorously demonstrated potency.

They will permit the elimination of active contaminants and the deleterious effects deriving from them.

They will probably lower initial cost and will certainly stabilize it, should any increased demand bid fair to exceed the natural supply.

By chemical modification, they may lead to the preparation of products which may be administered effectively by the oral route. While this is speculative, the triumphs of organic synthesis in the field of the alkaloids warrants a genial optimism.

And finally, by placing in the hands of the physician adequate amounts of pure standardized chemical entities of established quantitative, physiological activity at reasonable cost, they can produce an enormous alleviation of human suffering, prolong life and maintain physical efficiency.

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¶ To CHARLES CAMSELL '09, the gold medal of the Institution of Mining and Metallurgy of England in recognition of his "untiring zeal and great ability in promoting the development of the natural resources of the Dominion and in furthering the general interests of the mineral industry." Dr. Camsell is Deputy Minister of Mines and Industries of the Dominion of Canada.

¶ To Lt. LESLIE R. GROVES, JR., '17, a gold medal commemorating his services in restoring the water works at Managua after the March earthquake. He was also created a Chevalier of the Order of Nicaragua.

¶ To JOHN T. NORTON '18, a fellowship from the American Scandinavian Foundation which will take him abroad for study.

¶ To JAMES H. DOOLITTLE '24, \$10,000 for winning the Bendix Trophy in the National Air Races. He flew from Burbank, Calif., to Cleveland, 2,046 miles, in 9 hours, 10 minutes and 21 seconds, averaging 223.058 miles per hour. From Cleveland he flew to Newark, N. J., breaking Capt. Frank Hawks's transcontinental record by one hour and ten minutes. In his flight he received \$7,500 in prize money and \$2,500 for breaking Capt. Hawks's record.

¶ To D. THOMAS RUSSILLO '26, a bronze medal and \$100 for being a winner in a competition conducted by *Architecture Magazine* for a combined heating and ventilating unit. Mr. Russillo is supervisor of the Beaux Arts Atelier of the Providence Architectural Club.

¶ To JOHN G. KIRKWOOD '29, an European fellowship by the National Research Council. He left in September for a year abroad where he will do special scientific work either in Leipzig or Munich. Since 1930 he has been working under Dr. Keyes, Director of the research laboratory of physical chemistry here at Technology. With Dr. Keyes he has published a number of papers dealing with physical chemistry.

¶ To SANFORD A. MOSS, JR., '30, the Proctor Fellowship for study abroad given here at the Institute. During the past year he has been doing graduate work and received his master's degree in June. This year he will study either at Cambridge or the University of London, where he will specialize in applied colloid chemistry.

## Discovered

¶ By ARTHUR I. KENDALL '00, a new method of finding and isolating bacteria which hitherto have remained invisible. According to his colleagues it is one of the most important victories over disease

that has been achieved since the discoveries of Louis Pasteur. It will probably open the way for a more thorough and exact knowledge of such diseases as influenza, rheumatism, infantile paralysis, and sleeping sickness. Dr. Kendall claims that while experiments so far have been limited, a majority if not all of the known bacteria are subject to this new method of isolation.

Dr. Kendall has been a member of the staff of the Northwestern Medical School since 1910. The experiments which gave rise to his discovery have been conducted for a year with rabbits and with patients who were suffering with typical diseases at the Passavant and Evanston hospitals. Through simulating as closely as possible the actual conditions that occur in the human body, Dr. Kendall is said to be able to develop a culture medium which he calls "K" medium. That will change many bacteria from invisible to visible form, thus revealing them to the eyes of scientists for the first time.

The essential ingredient of this medium, according to Dr. Kendall, is a small intestine of man, swine, dog, or rabbit chemically treated. The scientist is now preparing a second paper in which he will describe completely his "K" medium so that its manufacture and testing will be possible in other laboratories.

## Honored

¶ KARL T. COMPTON, by receiving the honorary degree of Doctor of Science for his work as an educator and as author of many publications dealing with research in photo-electricity, ionization of gases, spectroscopy, electric arcs, and other problems of physics. This degree was conferred upon Dr. Compton by Stevens Institute.

¶ JOHN R. FREEMAN '76, by receiving the honorary degree of Doctor of Science from Yale University. The following citation was read by President Angell in bestowing the degree upon Mr. Freeman: "Modern society is a debtor at every point to the contribution of the engineer, and without his aid it would collapse forthwith into prehistoric oblivion. Recognizing your eminent public service in this great profession, and especially your position as one of the accepted leaders in the important field of hydraulic engineering, Yale University, desiring to accord you peculiar honor, confers upon you the degree of Doctor of Science and admits you to all its rights and privileges."

¶ ARTHUR D. LITTLE '85, by receiving the honorary degree of Doctor of Science from Columbia University. In conferring the degree, President Butler used the

following formula: "Arthur Dehon Little, chemical engineer, native of Massachusetts; a captain in the organization and direction of research in the science of chemistry in all its manifold revelations; covering in his field of interest and influence almost every aspect of chemical engineering practice; fertile in invention, practical in application and a genuine leader in the preservation and advancement of that organized body of knowledge which we know as science; one who, as even Sir Humphrey Davy would admit, pursues science with true dignity."

¶ DUGALD C. JACKSON, Head of the Electrical Engineering Department at the Institute, by receiving the Lamme award for outstanding achievement in engineering teaching. The award, donated by Benjamin G. Lamme of the Westinghouse Electric Company, has been made for the last four years to outstanding engineering teachers.

## Elected

¶ LAMMOT DU PONT '01, to the Presidency of the Manufacturing Chemists Association.

¶ SAM G. PORTER '03, to the Presidency of the Engineering Institute of Canada.

¶ PHILIP M. WENTWORTH '10, to a Vice-Presidency of the Stone and Webster Service Corporation with headquarters in Boston.

¶ CHESTER A. CORNEY '14, to the Chairmanship of the Boston section of the American Institute of Electrical Engineers.

¶ ISIDOR RICHMOND '16, to the Presidency of the Boston Architectural Club.

## Appointed

¶ GUY C. RIDDELL '04, general consultant on mining and metallurgy by the Central Control Commission — NKRKI, the powerful government department by which all Russian industry is held to account. This body with more or less mandatory powers diagnoses the status of the *Piatiletka* (Five Year Plan) throughout the length and breadth of the land at construction and production centers, recommending suitable measures for maintaining the pace.

¶ JOHN G. BARRY '07, President of the Texas College of Mines and Metallurgy at El Paso by the Board of Regents of the University of Texas. This is the first time in the history of the College of Mines that the institution has had a president of its own. "It is my ambition," President Barry said, "to make the institution a first class college of liberal arts and mining engineering second to none. I want to make it fully accredited in the Association of Colleges of South-

ern States, with the end in view, that any local student may receive as good a college education as in any other place; that those who have been away will return here to complete their work and that the college and community may attract many students and families as permanent residents, even from distant points."

¶ HERBERT J. GILKEY '16, head of the newly organized department of theoretical and applied mechanics at Iowa State College.

### Spoke

¶ KARL T. COMPTON, on "Science and Our Economic Problems" before the Portland (Ore.) Chamber of Commerce on June 29. Dr. Compton claimed that applied science has made more jobs, not fewer of them, and is responsible for the vast increase in human productive power that has made possible modern civilized attainments.

¶ GERARD SWOPE '95, before the Nat'l Electrical Mfr's Ass'n, Sept. 16, suggesting a plan to eliminate unemployment, stabilize business, and remove workers' fear of idleness, illness, and old age.

¶ CHARLES CAMSELL '09, before the Fiftieth Annual Meeting of the Royal Society of Canada, on the Empire's position as a producer of minerals. He expressed the opinion that the necessity for encouraging inter-Imperial trade in minerals and mineral products presents one of the strongest arguments, other than those of sentiment, for the working out and adoption of the policies proposed in this connection at the last Imperial Economic Conference.

### Written

¶ By WILLIAM T. HALL '95, a new second edition of the textbook "A History of Chemistry" originally by the late Professor Forris J. Moore of Technology.

¶ By HARRISON W. HAYWARD '96, a revision of the textbook "Materials of Construction" originally by A. P. Mills.

¶ By WALDO V. LYON '05, a textbook "Problems in Alternating Currents."

¶ By EDWARD P. WARNER '17, "Aviation Handbook."

¶ By F. ALEXANDER MAGOUN '18 and ERIC F. HODGINS '22, a book entitled "History of Aircraft."

¶ By FREDERICK H. NORTON '18, a textbook "Refractories."

¶ By FAIRFIELD E. RAYMOND '21, a book "Quantity and Economy in Manufacture."

¶ By RICHARD W. SMITH '21, an article entitled "Geology and Origin of the Phosphate Deposits of Tennessee" which appeared in the *Engineering and Mining Journal* for July 27, 1931.

¶ By EARL B. MILLARD, Professor of Theoretical Chemistry at Technology, a new third edition of the textbook "Physical Chemistry for Colleges."

¶ By JAMES F. NORRIS, Professor of Organic Chemistry at Technology, a new third edition of the textbook "Principles of Organic Chemistry."

### Published

¶ By CRESCENCIO F. GOMEZ '18, "Album de la Nueva Honduras" written in both Spanish and English.

### Retired

¶ WALTER S. MOODY '87, from active engineering work in the transformer departments of the General Electric Company, on July 1, after 43 years of continuous direction of this important part of the company's activities. He was a member of the first class graduated in electrical engineering. For one year he taught at Technology in the electrical and physical departments and then went with the Thomson-Houston Electric Company at Lynn in the new department just formed for developing Professor Thomson's electric welding process.

Some four years later the Thomson-Houston Company formed a separate department for transformer design and production and Mr. Moody was placed in charge. As this field rapidly widened with formation of the General Electric Company and the rapid development of the transformer art, Mr. Moody continued in charge of all new divisions formed to carry out such work at Lynn, Schenectady, Pittsfield, Erie, and Oakland Works of the General Electric Company. Over 150 engineers were eventually required.

Appreciating that the quality of magnetic steel is fundamental to building the best possible transformers, Mr. Moody early began to give much of his time to the metallurgy of such steel and has for over 30 years directed the co-operative efforts of the General Electric Research Laboratories and the Allegheny Steel Company in this direction. His position as a Director of the Allegheny Steel Company has assisted greatly in this joint effort that has given General Electric the best available silicon steel for all their transformer production.

In retiring, after these 43 years given to transformer design and production, Mr. Moody completes a record of responsibility for a transformer output far in excess of that of any other transformer engineer in the world. He retains his connection with the General Electric Company for consulting purposes.

### Deaths

¶ Reports have come to The Review since the last issue, of the decease of the following:

¶ FREDERICK H. STAFFORD '72, on June 17, at his home in Port Hope, Mich. For the last 14 years he had been President of the Village of Port Hope.

¶ JOHN A. HENDERSON '73, on July 11.

¶ HENRY S. HUNNEWELL '77, on January 21, 1931.

¶ FREDERICK R. NEWBOLD '77, on June 30, at his summer home in Beverly Farms, Mass. Mr. Newbold was retired from business but for many years had been interested in horticulture. He was one of the founders of the New York Horticultural Society.

¶ GEORGE F. SWAIN '77, on July 1, at his summer home in Ashland, N. H., following a long illness. After graduating from Technology he went to Berlin, Germany, for further study of engineering at the Royal Polytechnic School for three years. The University of New York awarded him the degree of LL.D. in 1907. When he returned to Boston from Germany he became an instructor at Technology, and on the death of Professor Vose, he succeeded to his chair with the title of Hayward professor of civil engineering which he held until he went to Harvard in 1909.

As a hydraulic expert, he was employed on the tenth census of the United States and contributed reports on the watershed of the Atlantic slope. In 1908, President Roosevelt appointed him a member of the inland waterways commission as a result of his work in collecting water power statistics during the tenth national census. In the following year he was appointed professor of civil engineering in the graduate department of applied science at Harvard, where he has since served.

In addition to his duties as a member or officer of various organizations and commissions, he had served as a consulting engineer in various states and had been an expert in many court cases. He was a member of the national conservation congress, which made an extended report to Congress some years ago, and represented Massachusetts and the Boston Chamber of Commerce at congressional hearings in behalf of the Weeks forest reservation bill.

On September 16, 1917, there was printed in the Boston *Herald* an article by Professor Swain on "The War and Education," in which he urged extensive scientific training for boys to fit them for the problems of the war and afterward. He last figured in the news in March, 1926, when a jury in the United States district court at Trenton, N. J., awarded him a judgment of \$3,059 against the city of Perth Amboy, N. J., for his services as consulting engineer in connection with the elimination of grade crossings. He was the author of several engineering books and articles.

¶ JOHN O. HENSHAW '78, on June 7, at his home in Cambridge. Mr. Henshaw was one of the best known figures in the New England pig iron trade.

¶ RICHARD H. HUNT '82, on July 12, at his home in New York after a month's illness. Mr. Hunt was a distinguished New York architect and former President of the Municipal Art Society, the Architectural League of New York, and of the New York Chapter of the American Institute of Architects. He belonged to the Beaux Arts Society, American Federation of Art, New York Society of Architects, Society of Colonial Wars, and the Society of Mayflower Descendants.

¶ FREDERICK S. MEAD '84, on June 26. Mr. Mead was a retired wholesale produce dealer. He was a member of the Boston Fruit and Produce Exchange and was on the Board of Selectmen in Arlington, Mass., for four years.

## FRATERNITY AND DORMITORY SCHOLASTIC DATA

(as of end of Second Term, 1930-31)

Comparative Standing of 28 Chapters  
(based on June, 1930-31, marks)

1. Sigma Omega Psi	3.33
2. Phi Beta Delta	3.27
3. Sigma Alpha Mu	3.23
4. Sigma Chi	3.19
5. Phi Mu Delta	3.13
6. Sigma Alpha Epsilon	3.09
7. Kappa Sigma	3.08
8. Delta Kappa Epsilon	3.07
9. Sigma Nu	3.05
10. Alpha Kappa Pi	3.04
11. Lambda Chi Alpha	3.01
12. Phi Beta Epsilon	3.00
13. Chi Phi	2.98
14. Delta Upsilon	2.971
15. Delta Tau Delta	2.970
16. Phi Gamma Delta	2.96
17. Beta Theta Pi	2.842
18. Alpha Tau Omega	2.841
19. Theta Delta Chi	2.840
20. Psi Delta	2.79
21. Phi Kappa Sigma	2.77
22. Theta Chi	2.76
23. Phi Kappa	2.68
24. Phi Lambda Alpha	2.66
25. Delta Psi	2.64
26. Phi Sigma Kappa	2.58
27. Theta Xi	2.42
28. Alpha Phi Delta	2.39

Comparative Standing of 28 Chapters  
over previous five-year period

1. Sigma Omega Psi	
2. Phi Beta Delta	
3. Alpha Kappa Pi	
4. Sigma Nu	
5. Sigma Alpha Mu	
6. Phi Gamma Delta	
7. Sigma Chi	
8. Theta Chi	
9. Delta Upsilon	
10. Chi Phi	
11. Psi Delta	
12. Lambda Chi Alpha	
13. Kappa Sigma	
14. Sigma Alpha Epsilon	
15. Phi Mu Delta	
16. Alpha Tau Omega	
17. Phi Beta Epsilon	
18. Beta Theta Pi	
19. Delta Kappa Epsilon	
20. Theta Delta Chi	
21. Phi Sigma Kappa	
22. Phi Kappa Sigma	
23. Theta Xi	
24. Delta Tau Delta	
25. Phi Kappa	
26. Delta Psi	
27. Alpha Phi Delta	
28. Phi Lambda Alpha	

Comparative Rating System Average of Dormitory and Fraternity  
Undergraduate Groups

(Based on June, 1930-31, Marks)

	Dormitories	Fraternities
Freshmen	3.12	2.77
Sophomores	2.99	2.72
Juniors	3.12	2.91
Seniors	3.30	3.26
Average Rating	3.15	2.93

¶ HEYWOOD COCHRAN '85, on August 1, as a result of an automobile accident.

¶ HORACE S. FRAZER '85, on June 7, following an operation. Mr. Frazer was a well known architect.

¶ ARTHUR C. ANTHONY '86, on June 27, in Marblehead, Mass. He was a member of the Boston Stock Exchange and of the firm of Townsend Anthony & Tyson, and was a trustee of the Boston Penny Savings Bank.

¶ JOHN G. HOWARD '86, on July 18, in San Francisco. After graduation from Technology, Professor Howard studied for five years at the École des Beaux Arts in Paris. His world wide fame as an architect began shortly after this and among his works were the Majestic theater at Boston, the electric tower at the Pan-American exposition in Buffalo, several New York hotels and other buildings.

For the past 25 years Professor Howard had been associated with the University of California and designed many buildings on that campus. Professor Howard was also a writer of note, being a co-author of "European Gardens." Two of his poems "Brunelleschi," interpreting

the celebrated architect, and "Phidias," a modern study of the ancient sculptor, won favorable comment.

¶ CLIFFORD M. TYLER '91, on July 21, at his home in Brookline, Mass. Since graduation he had been engaged in the fireplace and tiling business and was President and Treasurer of the Standard Storage Company and Treasurer of the C. M. Tyler Company.

¶ GARDNER F. WELLS '91, on August 21, in Boston. He was President of the Boston, Revere Beach and Lynn Railroad, and a member of the investment firm of Hemphill and Wells of New York. After graduation from Technology he became associated with the Thomson-Houston Electric Company of Lynn, and later was a pioneer in the electrification of street railway companies in many Massachusetts cities. He had been associated with the railroad he headed since its electrification in 1929.

¶ ANDREW P. NEWMAN '92, on June 27, at the Newton Hospital. He was engaged in the marble business with the Johnson Marble Company of East Cambridge.

¶ M. JOSEPHINE BEEDE '95, on June 16, in Pasadena. Dr. Beede had practiced in

Roslindale and West Roxbury as a physician for 18 years. While in Boston, Dr. Beede served on the staff of the New England Hospital for Women and Children and was a member of its board of trustees. In 1918 she was obliged to give up her work on account of her health and she moved to Pasadena.

¶ MAURICE K. WASHBURN '95, on February 9, 1931.

¶ JUSTIN W. CAMPBELL '96, on April 20, at Canton, Ohio. He was connected with the Union Metal Manufacturing Company at the time of his death.

¶ HOWARD K. JONES '96, on January 21, 1931, in Erie, Pa. Mr. Jones was a well known architect and was connected with the firm of Alden, Harlow and Jones in Pittsburgh. At the time of his death he was senior member of the firm.

¶ WILLIAM D. BLACKMER '98, on August 4, at his home in Nogales, Ariz. Mr. Blackmer, a veteran mining engineer of southern Arizona and the Mexican west coast was the former manager of the Palmero Silver Mine in Sinaloa, Mexico.

¶ PHILIP H. DATER '98, on July 12, at San Francisco. Mr. Dater was regional engineer of the United States Forest Service for the North Pacific region.

¶ GEORGE W. CARTER '01, on May 7.

¶ ERIK H. GREEN '01, on April 5, in Newark, N. J. He had been treasurer of the Agawam Chemical Works, Inc., Providence, since 1916.

¶ ARTHUR E. SWAN '02, on July 18, at his summer home in York Beach, Maine. He had been treasurer of the J. F. McElwain Company, shoe manufacturers, since its organization about ten years ago.

¶ JAMES F. DORAN '03, on July 12, in Hartford, Conn. For many years Mr. Doran was associated with his brother in the manufacturing of hat machinery. He was very prominent in the community affairs of Danbury, Conn., where he made his home, and during the war he was actively engaged in various relief activities. He was a member of a large number of civic, state fraternal, and national organizations.

¶ NATHAN A. MIDDLETON '07, on May 4. Mr. Middleton was a consulting engineer and since 1928 directed his own company, Middleton and Company, Inc., in Cleveland. During the war he saw active service abroad and was major of the 23rd Engineers.

¶ MITCHELL B. KAUFMAN '15, on November 5, 1930, from exposure and exhaustion while on a hunting party near Jackman, Maine.

¶ OTTOMAR O'DONNELL '15, in July, at his home in Denver. Mr. O'Donnell had been western representative of the American Gas Products Company since 1915, with the exception of periods of army service on the Mexican border and later in the World War.

¶ ALFRED H. CROSSMAN '23, on February 8, 1931. He had been sales engineer for the Pacific Electric Manufacturing Company of San Francisco.

¶ FRANCIS T. HAZELTINE '23, on July 16, as a result of an airplane crash in Trinidad, Colo. Lt. Hazeltine had been doing commercial flying for the last two years.

# NEWS FROM THE CLASSES AND CLUBS

1872

Fred H. Stafford died on June 17 last. For nearly 60 years he was a resident of Port Hope, Mich., where he went soon after he had completed his course at Technology. For the last 14 years he was President of the Village of Port Hope, and of the bank there. He also carried on a good sized farm, and rather recently became proprietor of a store in the village.

Strafford was not strictly speaking a graduate of the Institute. He was a strong student, perhaps the strongest in Course I in his senior year. He saw fit not to write a thesis which in those days was due after the course was otherwise completed and the examinations passed. The Secretary has been in touch with him for a few years past, and acquired a fondness for him. However, he had passed the allotted term of years, being in his 83rd year, and died peacefully at the close of a day's work. The following memorial shows in part, at least, the esteem in which he was held in the community in which he had lived for so many years.

"Again our village has been called upon to behold the passing of a prominent citizen. Again our official circle has been broken and the one to whose wisdom and guidance we have placed the highest honor possible within the civic life of our village has been called to give an accounting of the trust placed in his keeping. Fred H. Strafford, President of the Village of Port Hope, Mich., for the past 14 years, came to Port Hope nearly 60 years ago. Since that time he has been active in our local and county civic activities. As a member and President of the Board of Education, a member of the Common Council and President of our village, he has given unstintingly of his strength and energy and by sound judgment and wise counsel has filled a place in our lives and made a contribution to the development of this village that cannot be duplicated. . . ." — C. FRANK ALLEN, *Secretary*, 88 Montview Street, West Roxbury, Mass.

1873

The 61st annual meeting and dinner of the Class of '73 was held at the Hotel Bellevue, June 9, 1931. The following members were present: Williams, Borden, Tompson, Guild, Cogswell, Kimball, Forbes. Letters were received from those unable to attend. The officers for 1930 were reelected for 1931.

I am sorry to report the death on July 7, 1930, of Robert A. Shailer, also the death of John A. Henderson on July 11, 1931. The present membership of the Association is 14.

Under date of July 11, 1931, I received from Charles A. Belden of Ross, Calif., a very interesting letter which I quote in part: "I was very sorry not to be able to

attend the class meeting and dinner on June 9, but not being in the best of health, I could not go so far away from home. Thank you for the account of it in the *Boston Transcript* you so kindly sent me.

"I had the pleasure of attending the dinner of the Northern California Technology Association given in San Francisco recently in honor of President Compton. There were about 50 present, and it was quite a pleasant and memorable occasion. Representing the Class of '73, the oldest one represented, I was given the seat of honor, at the President's right, and received quite an acclaim when called upon to say a few words. I read a paragraph from the *Transcript* clipping, reporting our class to be the one that started the Alumni Association. . . ." — GEORGE M. TOMPSON, *Secretary*, 8 Whittemore Terrace, Wakefield, Mass.

1875

The reminder of the editors for Class Notes caught up with me in Victoria, British Columbia, some weeks ago. I was doing the cicerone act on a continuous go of the sight-seeing places fronting Puget Sound. There has been no odd half hour of daylight from that day to this on my own. In recent years I have not been able to assemble "thinks" or to write on moving trains, and when tired, I am out of commission. We returned to Seattle on Fleet Week, where the battleships on the Pacific Coast gather for their annual vacation. Officers and "gobs" look forward to this summer outing, for the welcome climate is dependable, made to order, "the best on the map in July and August and it is some fine change to what we have been up against in the south these last weeks," as a lieutenant remarked the night of the ball.

Excepting two days in Minneapolis in June, on my way west, I have managed to dodge the heat, have slept under blankets each night and haven't heard the buzz of a skeet. Ponder on that all ye who affirm this has been the hottest summer ever known! I was in Spokane three delightful weeks and the second day after my departure it was 102° and this was not the top of the sweltering month that followed. Next, I was four weeks in or near Seattle, then a trip to Victoria, Vancouver, and Bellingham. These notes are written in Denver, 18 hours after the time set by the Review editors that they should be in Cambridge. They are going by air mail this day (August 26) in the hope that they will be in under the wire — the best I can do under travel conditions.

Out from Seattle I stopped a day in Tacoma, another in Portland, and three days in Salt Lake City, where I resided for six years on the turn of the century. That was the halcyon copper era for Montana and Utah, and Butte and Bing-

ham were head liners in the papers. How those camps thrilled the changing world! Other than President D. C. Jackling of the Utah Copper Company, of those who were on the inside of these startling uncoverings of profit-paying copper ores, so far as I ken, Captain Duncan MacVichie is the only one now living. Not only is he alive and well, but he is still in the game, the most prominent mining engineer of Salt Lake City. My mail was sent to his care and it was a big disappointment that he was not at home while I was there. Mine was a minor part in the stirring battles in the courts, the largest known up to that time in which Captain MacVichie was hand and glove with the owners and experts on each side of the fence. This was my first visit since before the War and the changes in Salt Lake City are beyond my understanding. I was a lost sheep. An old tillicum, D. S. Spenser, now general passenger agent of the Union Pacific, is the only one who remembered me. We had a pleasant half hour going over old times and how in those fast-flying, glamorous days, we never appreciated how good the times were.

My last appearance in Denver till last evening was in 1912 at the time when Congress awarded the Panama Pacific Exposition to San Francisco, to the upsetting of the New Orleans apple cart. But that is another story of special moment to me, too long for these notes. My first entrance in Colorado was in June, 1881, and I was on the first train of cars to enter Leadville the following July. Garfield had passed on, Arthur was president, and the country prosperous from the outpourings of the mines. I lived in Colorado 26 years in close touch with its growth in mining, newspaperdom, politics, and industries . . . I am a guest at the Denver University Club, where once I knew every member, now all are strangers to my time in the Centennial state. How different it all is! But hold. I cannot go off on that trail, though there are willing listeners to the stories of the happenings of the 80's and 90's. The boys kept my tongue wagging to a late hour.

On September 3, I am due in Asheville, N. C., to tarry four weeks. The weather has turned uncomfortably warm, enough so for me to decide to cut out my stop in Kansas City and one in St. Louis, where I was expecting to call on classmate Bush to make good a standing promise. With the thermometer topping 95°, as it was there yesterday, social hobnobbing has sad drawbacks to my way of thinking, thank you. I am inclined to the notion that Bush will be thankful not to be asked to do the becoming. I am booked to return to Chevy Chase, October 15, and on the 31st I will roll into Boston as my summer tourist ticket expires! I plan to remain there two weeks to catch up on the Institute and alumni doings.

1875 *Continued*

I have to plead guilty in not having kept the faith in writing to President Hibbard the past summer, and should be properly called on the carpet as a negligent class secretary. Howsoever, The Review's not being issued from July to October and there having been no news of pressing moment might be worked in as an adequate excuse and, anyhow, Tom is an easy boss.

The only other class letter which found me in my travels was from Pierce, and it was much appreciated. When I assumed the duties of Class Secretary, Pierce wrote that he did not expect me to fill the office as had Hammatt of loving memory. Hence my elation to have his hearty approval of my poor endeavors. I look forward to shake his fist in New Haven on my way to Boston, the latter part of October.

Word reached me of the death of David Warren Phipps '76, the patriarch of '75, who died in Seattle on April 30, 1931. He was born in Plymouth, Maine, August 29, 1837, and had he lived four months longer, he would have been 94. When 14 years old he was disabled on a vessel and walked on crutches. I well remember him, his determination to win an education in spite of tremendous obstacles, his pointing out to me the error of my ways in my not making the most of my opportunities and his warnings that I would live to regret it with bitter tears. He hit the nail true, may he rest in peace! A more detailed account of his life will be found in the Class of '76 notes. — HENRY L. J. WARREN, *Secretary*, 4700 Langdrum Lane, Chevy Chase, Maryland.

#### 1876

David W. Phipps died at Seattle, Wash., on April 30, 1931, at the age of 93 years. Phipps, at the time of entering Technology, was much older and more mature than other members of our Class, being 35 years of age, while most of us were about 18. This lessened his intimacy with his younger classmates, but all respected him as a remarkably serious-minded and earnest student. Moreover, he was seriously crippled for life at the age of 14 by an accident resulting in a broken hip, which precluded his entering engineering activities. This caused his remarkable thirst for book knowledge to center in Technology's more literary courses, particularly those on logic and philosophy of science under Professor George H. Howison, who was one of the most brilliant exponents on such subjects that could be found at that time in any college faculty in the United States.

Phipps was born August 29, 1837, in an old farmhouse built by his grandfather in Plymouth, Penobscot County, Maine. He was the son of Stephen and Phoebe (Warren) Phipps. His father, like many of his fellow townsmen, had been sailor, farmer, and mechanic as opportunities offered. The family moved to Belfast, Maine, at "Head of the Tide" while David was young, and there he grew up, attending the country school for three or four winter months, working on the farm summers, until the accident already

mentioned left him a cripple and put an end to his attendance at elementary schools. Forced, after recovery from his accident, to go about on crutches, and having a great fondness for books and a strong desire to learn, but with few lines of activity open, he learned type-setting and obtained an appointment as a compositor on various country newspapers at small wages, meanwhile earnestly continuing his studies at home. He early became a devoted follower of Lincoln, Greeley, and the Republican leaders of Civil War days. More than once he lost his job because of his strongly expressed opinions on public affairs at variance with the politics of the paper.

When about 24 years of age, having married, he sought broader opportunities and moved to Boston working as a compositor on *Zion's Herald* and various other religious weeklies, meanwhile continuing his studies at home to fit him for entering the Institute. To gain more time for study and at the same time provide for living expenses during his Institute courses, he conducted a lodging house with his wife's aid. About ten years after moving to Boston he managed with great industry to prepare for entrance examinations, and to work his way through the Institute and later the Boston University Law School. These were remarkable achievements considering his crippled condition and his lack of early opportunities for schooling.

In 1882, having passed the examinations of the Massachusetts Supreme Court and having been admitted to the Massachusetts bar, he hung out his sign as a lawyer at 209 Washington Street, Boston, but did not practice actively because of his condition. He once confessed to the writer that while he believed himself well equipped mentally for a lawyer's life, he was very sensitive about his appearance in court with his short stature and his crippled frame. In 1887 he moved to Seattle where he entered the law office of Lewis & Gilman. (This partnership comprised James Hamilton Lewis, later U. S. Senator from Illinois, and L. C. Gilman, later prominently connected with the Milwaukee Railroad.) Phipps preferred the Pacific Coast, while his wife preferred to remain on the Atlantic Coast and to go back to her old home in Maine, and, in course of time, an amicable dissolution of the marriage tie was arranged. They had no children.

A little later, after admission to the Seattle bar, Mr. Phipps opened a law office of his own. He was burned out in the big fire of 1889 losing all his office furniture and the greater part of his books, which loss he could not then replace. Three years after moving to Seattle, David married Anne S. Davison of Belfast, Maine, who survives him, a most devoted wife. They had no children.

After two years in Seattle, Mr. Phipps became interested in real estate, and among other ventures, put up an apartment house during the great building boom which followed the fire of 1889. When the bottom of the boom dropped out and the house became nearly empty,

Mr. Phipps and his wife moved into it, hoping to save their interest by closer supervision, but this was of no avail and the property had to be sacrificed. Because of being held back from the activities of a lawyer's life by his condition and ill health, Mr. and Mrs. Phipps continued in the business of leasing rooms and apartments until they were again burned out in 1910. After this second great misfortune, they gave up these activities, moved out into the suburbs of Seattle where they owned a small piece of wild land, on which they carved out and built up a quiet, comfortable home for themselves and lived a tranquil, rural life, happy among their fruits and flowers until Mr. Phipps' health failed some four or five years ago. Finally he became blind and almost helpless.

Prior to this blindness, his great diversions were books and philosophical studies. He never cared for accumulating more than a modest competence nor for public office in which his ability and legal knowledge might have brought him opportunities, although he was greatly interested in social problems. In his early years he became an active member of the Methodist Church and in his later life a member of the Theosophical Society. Years ago he sent your Secretary for perusal one of his lectures on "Reincarnation," full of learned references to far-Eastern philosophy, but beyond the reader's grasp.

The last letter from Phipps which your Secretary received was written by his own hand on March 27, 1923. This stated pathetically at the close that he had written it by sense of touch unable to see what he had written. His widow, Mrs. Anne S. Phipps writes: "He was an exceptionally lovable man. Everybody with whom he came in contact was his friend. The children of the neighborhood were very fond of him. Even the little girls, when they came in, would look around and ask, 'Where is Mr. Phipps?' and when I told them, out they would run to the woodshed, garden, or wherever he was. Not very flattering to me, perhaps, but thus it invariably was — a fine tribute to his kindly ways." He died rich in friendships and in kindly memories. — JOHN R. FREEMAN, *Secretary*, 815 Grosvenor Building, Providence, R. I.

#### 1877

A letter from H. H. Carter accounts for one of the missing men in the Class of '77: "There was a John P. Riley connected with our Class. He was a Roxbury boy; studied architecture; went to New York years ago and was connected with the firm of Baumgartner and Company, architects and decorators. Riley was connected principally, as near as I can find out, with designing furniture and interior decorating. He died in 1929."

From George W. Kittredge I learn that Robert D. Geer died at his home 3 Dudley Place, Yonkers, N. Y., on October 18, 1914, of angina pectoris complicated by acute indigestion. He left a widow, since deceased, but no children. He was buried in Syracuse, N. Y., his

1877 *Continued*

widow's home city. At the time of his death he was connected with the Department of Docks and Wharves in the City of New York, and had been in that city's employ for many years.

In response to President Clarke's invitation, the following members met with him at the Algonquin Club at one o'clock on June 8, 1931, for luncheon: George W. Kittredge, Joseph P. Gray, Col. George F. Quinby, William H. Beeching, Frank I. Sherman, Henry H. Carter, Edward W. Davis, and Benjamin C. Mudge. Arthur W. Thayer came in to extend greetings and stopped for a short time.

Invitations were sent out to 41 members of the Class and replies were received from 28. A reply from the family of Henry S. Hunnewell was received giving the date of his death January 21, 1931. Among these replies were letters from George Bartol, Thomas F. Simpson, George F. Swain, and Harry C. Southworth. George Bartol writes: "I regret very deeply that I shall probably not attend the lunch on the 8th inst. I have to be in Massachusetts about four days later, but all plans previously made prevent changing my dates. Please say that I am well and able to attend to what little business there is, and to play golf as occasion offers, and would enjoy nothing more than meeting you all, but hope to do so next year."

From Thomas Stimpson: "Replying to President Clarke's invitation to meet with the Class at the annual reunion and lunch on the 8th of this month, I shall have to advise that I do not see an opportunity to do so. It is indeed lovely of Mr. Clarke to do this and I greatly appreciate the privilege. It has always been satisfying and inspiring to me to be connected in that fellowship which seems to me dearer and dearer from year to year as time goes by."

George F. Swain writes: "My best love to every member of the Class and especially to President Clarke. May the next year bring health to all." Harry C. Southworth sent in the following: "I mislaid my postal notice, but this letter will do. I regret that I will not be able to attend the Reunion owing to ill health. I walk with a cane and prefer to use two. I gave up my business January first and should have done so before, but I hated to close a business of 60 years' continuous existence. Finally I was able to rent a very low rental and hope my successor will succeed although the business has to some extent become a 'victim of progress.'

"To console myself I have been looking over our class history. My conclusions are that we were a better looking crowd in 1910 than in 1877, also that we can be satisfied and proud of the history of our Class as a whole. It would be interesting if our history could be brought to date, but I fear the job would be too much to attempt. I regret my own record was not so good as I could make it had I to do it over again. I have never sought political office but on several occasions I have been drafted and have served my town on the water board and the finance board.

"My most useful public service was my work in the Michigan legislature helping Senator Dunstan — afterwards Lieutenant-Governor — to get the backing of the state for the mining school at Houghton. The early history of the Houghton school as I remember it was something like this. A number of public spirited citizens of Houghton started the school in the 80's and wished the state to back it up. But the Lower Peninsular men were opposed to the scheme, which was not popular with the rural members who said that if the mines wanted the school, 'let them back it up,' ignoring the fact that the mines paid heavy taxes to the state; while the Upper Peninsular members claimed that the state should adopt it into the already splendid state system of education. I cannot claim so much credit, for Senator Dunstan was a seasoned politician and I had mostly only to obey orders. We needed 51 votes on roll call for final passage, a majority of all members elect, and we got them by a small margin, with a reserve of friends who were willing to change their votes if necessary.

"I read Hibbard's account of travels in The Review. I took out a life subscription years ago when I had more money than I needed and enjoy reading it very much. Possibly you noticed that I wrote something in regard to the class colors in a recent number. My article was preceded by one from a member of '76 and followed by another. Were the classes interested '75, '76, '77, and '78, or '76 to '79?"

Kittredge called on Swain and found him so much improved that he was able to sit up. (Since these notes were written, The Review has received word of Mr. Swain's death. See *Adversaria*.) — Wood called the President by phone sending greetings to the Class. Charles A. Clarke was elected President and Belvin T. Williston Secretary and Treasurer. — BELVIN T. WILLISTON, *Secretary*, 3 Monmouth Street, Somerville, Mass.

### 1883

On June 15 the Class held a reunion at the Salem Country Club, Peabody, Mass. Those present were: Capen, Chase, Gale, Smith, Underwood, Vose, and Wesson. The following ladies were with the party: Mrs. Chase, Mrs. Gale, Miss Elizabeth Smith, Mrs. Underwood, Mrs. Wesson, and Mrs. Cotton, daughter of George Underwood. Donald Vose came with his grandfather, Julien Vose. The party had a delightful time renewing old acquaintances and spinning yarns. Some of the men enjoyed the golf course, while the ladies amused themselves at cards.

An important item of business was the reinstatement of George H. Capen to membership in the Class. On account of his not answering letters of the Secretary three years ago, he was declared officially dead, and his name dropped from the Class.

A telegram was received from Kingsbury, full of all kinds of good wishes, and letters were read from Alexander, Boyden, Bryant, Eppendorff, Mansfield, Lawton, Merryman, and Stevens. — After dinner

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in the evening, at the end of a perfect day, the first clear day after a week of rain, the crowd broke up, going in various directions in their cars. It was the consensus of opinion that everybody had had a good time, and that all efforts would be made to get together two years hence to celebrate our Fifty-first Reunion. — DAVID WESSON, *Secretary*, 111 South Mountain Ave., Montclair, N. J.

### 1885

A letter from A. P. Cochran, son of Heywood Cochran, says that his father was killed in an automobile accident on August 1. There were no particulars with the letter.

The sudden death of Horace Frazer on June 7 was a sad blow to the class. At our last meeting with him, his physical condition was greatly improved, although he was not strong and had to conserve his energy carefully. He went to the hospital for an operation, from which he appeared to be recovering, when he had a sudden relapse and passed away. Horace was a choice spirit, artistic and sensitive in his ideals, heartily interested in any class matter where he could be of service, and although he was only with us at Technology during the junior and senior years after his graduation from Yale, no one had the class or its individual members closer at heart than he.

In his professional work, he occupied a place all his own, combining a sense of harmonious architectural fitness with the imaginative skill of an artist. The residences he designed were not only strikingly attractive, but were models of comfort and convenience. Many of the most beautiful places on Cape Cod are monuments to his architectural genius. Horace was particularly delightful as a guest of Everett Morss, on the occasion of our Forty-Fifth Anniversary, and often referred to it with great appreciation. He attended the Sheffield Scientific School at Yale, specializing in chemistry, and graduating in 1883. After completing his architectural course at Technology, he was associated for a time with the offices of Peabody and Stearns, architects, and he later was with the firm of Longfellow and Harlow, eventually becoming a member of the firm of Chapman and Frazer. When his partner died he continued the business without changing the firm name. He was 69 years of age.

Hotel Kenmore did itself proud as host at the Class Dinner in June. There were only 12 present as the date was an important one for several members. Reddy Fiske, who has been residing at local hospitals most of the time for the last two years, showed up so well and hearty that we feel he should return some of the sympathy we have been feeling for him while he was taking his beauty rest. Lyman Sise was there too, getting livelier every year, and Charlie Peirce, who had prepared an oration for the occasion, forgot all about it in that intellectual atmosphere. A large part of the evening was spent in talking over the splendid time we had at Ev Morss' last year. Ev had just got out of the hospital and could

1885 *Continued*

not be present, but each one of us talked with him by telephone and also with Charlie Brown at Salem. Taking advantage of Ev's absence, he was elected permanent Class President.

A merger of shovel manufacturers, with the Wyoming Shovel Company in the list, has just been announced. We fear this will deprive us of the appreciative joy of reading Nat Robertson's Red Edge Shovel advertisements in *The Saturday Evening Post*.

The Boston *Herald* recently carried a news item to the effect that Dr. Mary E. Jones, 76-year-old physician and college graduate, from whose home in the South end 13 dogs and eight cats were evicted by the board of health in May, brought a bill in equity in the Suffolk superior court, charging that she was sent to the Boston State Hospital as part of a conspiracy to deprive her of her property. Dr. Jones is a Vassar graduate and a member of the Class of '85, at Technology, as well as a graduate of the New York Medical College for Women. She was for 41 years a practising physician in Boston, and is said to be worth \$100,000 in Boston real estate.

You ask about Dave Baker? Well, listen to this. A column article in a recent Sunday *Herald* describes a remarkable golf development at Wellfleet, Cape Cod. Dave's ancestors lived there and when he finished his big job of creating the immense plant for The Broken Hill Proprietary Company in Australia, at the outbreak of the war, he retired to the ancestral mansion and has since been the pivot about which the town revolves. Dave has a rare faculty of giving an interview as the following excerpts from the article attest. "A full-fledged country club began its career on the lower Cape this summer when the Chequesset Golf Club, Inc., opened to Wellfleet's guests a domain of 130 acres, which is a beautiful, primitive region of rolling hills and placid waters. There is a nine-hole golf course, a stable of ten saddle horses, tennis courts, a swimming float, spacious clubhouse, and everything in the way of scenery, along with bracing sea air — everything the outdoors lover could wish for. . . . The layout of the golf course seems to please every one," says Mr. Baker. Numerous members of the art colony at the Cape tip are regular visitors, besides business and professional men summering here with their families. . . . Mr. Baker, who has been the leading spirit since the inception of the project, is chairman of the board of governors of Chequesset Golf Club; David Baker, Jr., is treasurer. The opening of the club marked the fulfillment of a dream cherished for a number of years by David Baker of Wellfleet and Philadelphia, retired metallurgical engineer, and his associates, men prominent in Wellfleet and Boston."

Bob Richardson faithfully remembers the Secretary. Every month or two comes a postal card from some strange port in Central or South America where Bob is wandering in the interests of the Electric Bond and Share Co. The writer has tried

to corner him in New York for several years, without avail. He seems to get wind of it. His last postal card, from Chicicas Tenango, if that is the proper pronunciation, carries a picture of a religious festival of the Chichi Indians, and is sent as a suggestion for costumes at our Fiftieth. Well, Bob always prefers to associate with the degenerate descendants of these heathen tribes on our anniversary occasions, and if he fakes an excuse for being absent four years from now, his vacant chair will bear a placard — "Sic transit gloria Magnum Gazabo!" — ISAAC W. LITCHFIELD, *Secretary*, Twin Ash Farm, Medfield, Mass.

## 1887

The Class Dinner was held on June 12 at the Parker House, and was a most interesting and enjoyable affair. Nineteen men were in attendance: President Taintor, W. H. Brainerd, Draper, Gay, Mulliken, Very, A. L. Cushing, Sever, Cole, Lane, Cameron, Carter, Hobart, Blake, Coombs, Carney, W. R. Thomas, Goss, and A. R. Nickels recently from Idaho, who made his first appearance at a class function in many years. A general discussion followed the dinner, in which all the members participated, concluding with an outline by President Taintor of the European situation as he saw it during a six months' travel abroad.

The following article from the May number of the *Arizona Mining Journal* will be of interest to all the members of the Class of '87: "Frank E. Shepard, superintendent of the Denver mint, has made a direct but unofficial appeal for the establishment of silver coinage on a ratio with gold of 20 to one, or whatever figure may be agreed upon by the leading nations of the world. — The concentration of more than two-thirds of the world's gold in the United States, France, and England, the effort to place India on a gold basis, and the debasement of silver coinage in England and many European countries were all cited as causes of the world depression in industry.

"Mr. Shepard further stated that the low price of silver has affected all commodities and has destroyed the purchasing power of more than a billion people. The world's gold supply has been steadily decreasing since 1915, while the demands of world trade for credit expansion have been increasing at the rate of more than 3% a year. More than two-thirds of the world's gold is concentrated in the United States, France, and England to the proportion of 40%, 20%, and 7%, respectively. This monetary condition is destructive to world trade and the remedy seems to be the re-establishment of silver on a fair ratio with gold by the leading nations.

"Shepard is a native of the Bay State. After graduation he turned immediately to practical lines and hired out as a machinist on the Boston and Albany Railroad. A year later he entered the inspection of boilers and vessels for the United States government; and the next year he traveled west to Colorado, where for many years he was President of the

Denver Engineering Works, engaged in the development of mining and sugar machinery. He is a deep student of world economics, a keen thinker and a speaker of ability. Included in the local and national organizations of which he is a member are the Colorado Scientific Society, the A. S. M. E., and the American Institute of Mining and Metallurgical Engineers."

A number of members of the class paid a visit to Herbert M. Howes at his home in Hingham shortly after the Class Reunion in June, and although he is still unable to talk, he was delighted to see them and to hear their descriptions of the meeting. His condition is reported to be about the same as a year ago. Any member of the Class who happens to be cruising down along the South Shore should look in upon him at his little home on Hersey Street, Hingham, where they can be assured a hearty welcome from both Howes and his wife, who is most constant and devoted to his welfare. — EDWARD G. THOMAS, *Secretary*, 1930 Calumet Avenue, Toledo, Ohio. NATHANIEL T. VERY, *Assistant Secretary*, 66 Orne Street, Salem, Mass.

## 1888

For the third time in as many years the Class was entertained at dinner at the summer home of Edwin S. Webster, Chestnut Hill, Mass., on June 25. Each of these dinners has surpassed the previous one, if that were possible, the last reaching the apex of hospitality and good fellowship. Those present were: Bates, Blood, Bridges, Cole, B. R. T. Collins, Connor, Faunce, Fuller, Hamblet, Horn, Keough, Lee, Reynolds, Runkle, Sawyer, Shaw, Sjöström, Stetson, Thompson, Webster, Williams, and Wood.

Regrets were received from Besler, Cheney, Dearborn, Faxon, Ferguson, Flint, Holman, F. A. Moore, Quigley, Perkins, Roberts, Smith, Stevens, Sweetland, Wright, and Buttolph. Besler had a conflict with his final Directors' meeting for the summer of the C. R. R. of N. J. which prevented his presence at the dinner. He is almost always present at our class functions and promises to be at our Forty-Fifth Reunion in 1933. — Flint writes that some time ago he was knocked down by an automobile in New York and though not seriously injured has been slow in coming back. — Our Class Commodore, Walter K. Shaw, with his *Andiamo* and *Indian* has won so many races either by a "runaway" or a "nose" that we will be unable to give a complete list of his winnings this summer until the next issue of The Review.

E. S. Gould, formerly of Lawrence, Mass., is now in the grain business in Fort Worth, Texas. He says Texas has the largest grain crop this year in 20 years and that 45,000 cars will be needed to handle the wheat alone, to say nothing of the oats. — Our genial classmate Edward P. Quigley of Birmingham says: "Please extend to each and every one of the veteran survivors of our gray haired (where there's any at all on top) brigade, cheeriest greetings from Quigley."

T. A. Foque of Minneapolis says to himself every year that he is going to attend the Class Dinner but he never does it. However, we expect him to surprise us at our Forty-Fifth Reunion in 1933.—Henry D. Bates made his first public appearance for some years at the Class Dinner and we were all glad to see him looking so well.—George Holman of Hartford shows his class loyalty by using P. O. Box 88 for the past ten years. He was unable to be with us this year.—Fred Nichols is supposed to be somewhere in the wild far West and you can expect to hear some exciting adventures experienced by him in the next issue.

Connor of Exeter, N. H., won the long distance prize this time but he will be beaten 1,000 miles in 1933. Dwight H. Perkins of Evanston, Ill., expresses a desire to attend an '88 class dinner, which he has been unable to do up to date. We assure him that a class dinner at Ned Webster's is worth traveling 2,200 miles to attend, and hope to see him sometime. We expected to see Billy Dearborn at the dinner but he was unable to be there. We hope to hear all about his experiences in Cuba at some future gathering of the Class.

Sanford Thompson was starting on a trip to the West when he received the dinner notice but by using a little of his well-known efficiency arrived back two hours before the dinner and didn't miss a thing, much to our mutual satisfaction.—Ben Buttolph wired his regrets and appreciation of Webster's hospitality.—Stetson wired his acceptance and arrived on time without his whiskers which made him look 20 years younger. He cannot be called "the late Mr. Stetson" any more.—George C. Scales now resides at 9 Orlin Avenue, Minneapolis, Minn.—Sumner B. Merrick is now in business at 702 Burk Burnett Building, Fort Worth, Texas.—BERTRAND R. T. COLLINS, *Secretary*, 18 Athelstane Road, Newton Center, Mass.

#### 1889

The Cleveland (Ohio) *Trade* of May 23, 1931, carried an account of the life history of Victor Windett, accompanied by a good photograph. "Since his graduation he spent 12 years at the South Works of the Illinois Steel Co., Chicago, in mechanical engineering work, which included the testing of fuels, and so on. As a civil engineer in charge of the department he was engaged in field work of construction and hydrographical surveys. He designed, patented, and built several thousand feet of concrete dock work and also engaged in general steel works constructions. For a time he also conducted metallurgical work, chiefly in bessemer practice. Mr. Windett next became Chicago representative of Julian Kennedy, Pittsburgh, engineer, and was in charge of construction of blast furnaces C and D of the Iroquois Iron Co., South Chicago, participating in their design."

"For a time he was engaged in railroad work, designing, field engineering, and construction both in Illinois and Wisconsin. Then as a general contractor he

engaged in heavy excavation, foundation, dock, harbor, bridge, and steel work in Illinois and Indiana. He also built more than 13 miles of seacoast protection levee below New Orleans and constructed a portion of the New Orleans drainage system.

"During the War as engineer with Wellman-Seaver-Morgan Co., Cleveland, he built open-hearth steel furnaces at the Watertown, Mass., arsenal for the government, sulphuric acid plants for the war department in Wisconsin, and supervised inland waterways steel barge construction. When Wellman Engineering Co. succeeded Wellman-Seaver-Morgan, Mr. Windett went along as engineer and on January 1, 1928, became manager of the gas producer division. He since has engaged in engineering, design, sales, and executive work in open-hearth furnace, gas producer, and coal carbonization processes."

Governor Pinchot of Pennsylvania has retained Major Clayton W. Pike as consulting engineer to prepare rate cases against the Philadelphia Electric Company and the Duquesne Light Company of Pittsburgh as a result of testimony developed before the House Utilities Investigating Committee.—George Russell has been ill for several months at his home in Lawrence.—WALTER H. KILHAM, *Secretary*, 9 Park Street, Boston, Mass.

#### 1891

The Fortieth Reunion of the Class was held at the East Bay Lodge, Osterville, Mass., on June 12 to 14. Lowery skies on Friday morning were followed by good weather. Our landlord, Mr. Brown of East Bay Lodge, took good care of us, and our Fortieth passes into history as in every way satisfying to those who were able to attend, with regrets for those who for one reason or another could not come. There were 43 present for at least some part of the festivities. Eight others had tentatively agreed to come. This was five more than attended the Thirty-Fifth. Of those who attended our Thirty-Fifth, 24 came to the Fortieth, and there were 19 at the Fortieth who were not at the Thirty-Fifth.

Those present were Ambrose, Aiken, Barnes, Bassett, Bird, Blanchard, Bowen, Bradlee, Brown, Capen, Cole, Dana, Douglass, Earl, Ensworth, Fiske, Forbes, Fuller, Hatch, F. C. Holmes, G. A. Holmes, Howard, Howland, Keene, Kimball, Knowles, F. C. Moore, A. R. Pierce, Read, Rogers, Ryder, Smith, Spooner, Swan, Tappan, Thompson, Tyler, Walker, Warren, White, Whitney, Wilder, and F. A. Wilson. The majority gathered at the University Club, Boston, on Friday morning and motored to Osterville, arriving for lunch. Bassett drove from Waterbury, Whitney and Ensworth from Hartford, Holmes from Plymouth, Pierce from New Bedford, and Ryder from Middleboro. Moore was the long distance man from Illinois. G. A. and F. C. Holmes, Kimball, and Warren did not come down until Saturday. Harry Bradlee called at Cohasset and brought Barney Capen.

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After lunch and a general get-together, some of us were introduced to the new (?) sport archery, Dana having furnished the essentials. It was soon evident that this sport was especially for the benefit of Arthur Howland, as no one else could hit the target except by accident. The archery tournament was held on Saturday afternoon and the time for practice was insufficient for any of the novices to become experts. A few got in some golf practice and the Secretary took some over to the Wianno Club to see a new Grinnell Simplex (pressure tank) automatic sprinkler system, the first to be installed in this part of the country.

After dinner was the bridge tournament. Howard Forbes had prepared a rather elaborate scheme for a contract bridge tournament but our class does not believe in these new fangled games and one table of four was the result, plus a couple of tables of auction. Howland, Keene, Bird, and Fiske made up the quartet and Eli nosed out the Secretary on the last hand of a pivot game.

Early to bed was in order at our age, but early to rise also applies and those who were out Saturday morning got a good sample of best quality Cape Cod weather. After breakfast, sports were in order but we have to admit that our Class is not sportily inclined. Two foursomes, including two golf players, went around the Wianno golf course, with Forbes and Spooner accompanying as usual, one making up the audience, and the other chief caddy for Blanchard. We are sorry to record that Blanchard has been dethroned as Class golf champion by a newcomer, Tom Keene. Where has he kept himself all these years, and how can a man of his age (?) play such a good game? The archery tournament in the afternoon was far more popular than golf, not because of more individual ability, but presumably because less movement was required, and most of the time no movement at all was necessary.

Saturday noon was the clam bake, and it left nothing to be desired. We went to Giffords (boat house) on Cotuit Harbor and there sat and ate in the proper clam bake style. In order that no one may misunderstand the Secretary's ability to dispose of sea food, it should be explained that this is largely a matter of training, environment, and experience, not size of stomach. Hartley White arrived for the bake with Mrs. White.

The banquet was held that evening with 39 at the table. Charlie Aiken was toastmaster; Barnes, song leader; Wilder at the piano; President Bradlee presided. There were two notable events. One was the presentation to Charlie Aiken of a wedding cake surmounted by a miniature bride and groom, Charlie having recently married a lady from Lorain, Ohio. Charlie admits that this was the outcome of a romantic steamer trip to Australia. Incidentally, the Secretary duly received a bill for one bride and groom which was paid from the Class funds, the first time in class history, but we are prepared to repeat if necessary.

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The other unusual event was the unfurling of the new official Technology flag with a song written by Arthur Hatch. Gorham Dana explained that there had never been an official flag and one had just been adopted by the Technology Council and this was the first public showing. Incidentally, on Sunday we took this over to the Oyster Harbor Club where the Class of '06 were having their Twenty-Fifth Reunion. The flag is of Technology gray with the seal in red in the center.

After the President introduced the toastmaster, a silent toast was given for those who had passed on, and the names of those who have died since our Thirty-Fifth were read: Robert W. Bissell, James R. Blair, William P. Bryant, Hugh B. Clement, Thomas Creden, John Daaland, Charles F. Hammond, Rowland S. Ludington, Frederick C. Moore, Fred F. Moore, William I. Palmer, Marshall S. Scudder, Edward M. Weld, and George H. Wetherbee. Telegrams and cables were read from Young in Cannes, France; Leland in Berkeley, Calif.; Hannington in Denver; and Gottlieb in New York. A number of extracts from letters were read later in the evening. Hersam, who is a professor at the University of California, has been East on a trip and expected to attend, but was obliged to send regrets at the last moment.

Charlie Aiken gave some interesting anecdotes of his Australian and New Zealand trip, and as no one else had been there, we felt obliged to accept everything he said. He "introduced" Barney Capen, our new Assistant Secretary, who told of his attempts (generally successful) to get in touch with everyone in the Class, get them to come to the Reunion, and send in a questionnaire. There are 179 on our active list and letters were received from 74 (mostly to Barney) and questionnaires from 134. Barney has been on the job for months and when he tells how much it all means to him, we can respond that he means just as much to the Class. And how he enjoyed every minute of the Reunion!

Giff Thompson gave a few experiences in foreign lands. He is doubtless our prize globe trotter and has been most everywhere (except Australia). After dinner we adjourned to the main lounge and Charlie Aiken officiated at a general discussion of the proposal to change the methods of electing corporation members and running the Alumni Council. Charlie insisted on votes for each item and will make a report to the committee in charge. In general, we felt that the present methods were satisfactory but we were heartily in favor of an Alumni Secretary who could make proper contacts with Technology Clubs and Alumni throughout the country. For further information see Aiken, Dana, or Hatch, all of whom are on the Alumni Council.

The Secretary presented the class statistics which follow. The active list now numbers 179, with 60 others whose addresses are not known, and 85 deceased. Only three have died in the past year and 14 in the past five years. There

were 134 questionnaires sent in, due to the activities and persistence of Barney Capen. This is 33 more than five years ago. (Note: figures in parentheses are the Thirty-Fifth Reunion statistics.) Present occupations show 40 executives (30), 24 retired (9), 21 engineering (22), 12 private business (5), 9 professors and teachers (5), 6 architects (6), 4 insurance (5), 4 salesmen (1), 3 public officials (2), 2 each lawyers, ministers, and miscellaneous. It should be noted that the greatest gain is in the retired list but it will take some years at the present rate for them to be in the majority.

There are 122 married, two widowers, and ten not married. Twelve have been married twice and one three times, the last stating that his first two wives died a natural death. Twenty-three have no children (10), 33 have one child (27), 31 have two (25), 23 have three (18), 9 have four (4), three have five (2), one (Roberts) has six, one (Pinto) has eight. Wason and Bell had twins. Forty-two have one married child (26), 17 have two married children (4), 9 have three (4), and one has four. This shows a large increase in married children during the last five years.

There are 57 grandfathers against 29 five years ago, an increase of 100%. Twenty have one grandchild (13), 19 have two (9), 10 have three (4), two have four (1), one has six, two have seven (Howard and Warren), one has eight (Hawley), and one has ten (Rooney). This makes a total of 134 against 56 five years ago, a present average of one for each questionnaire.

Golf again leads as the favorite sport with 37 (19), motoring 12, fishing 10, followed by yachting, tennis, camping, climbing, horses, tramping, bridge, and so on, including curling, archery, and chess. No question but golf is the old man's sport. Seven admit they sing; four play the piano (one only when his wife is not around); three the violin; one each the cello, viola, and organ. The Class has always admitted its weakness on musical ability. As usual the Class is overwhelmingly Republican in politics, 66 against 12 of all varieties. Only three admit to be regular (?) Democrats.

Religious affiliations are more varied rather than less. Episcopalians, Congregationalists, and Unitarians are approximately the same and are about two-thirds of the whole. Then come Presbyterians, Baptists, Christian Scientists, Methodists, Universalists, Swedenborgians with one each of Quaker, Jew, Catholic, and New Thought. Three claim to be Agnostics but that can hardly be classed as a religion. Smoking is still popular with 76 yes and 43 no. The drinkers and non-drinkers about break even with 55 yes and 61 no. One says he only drinks at class dinners. Others might perhaps have said that they drink everywhere else.

Apparently the Class has all known hobbies and many not known heretofore. Just to prove the varied mental characteristics of 91 men, here are a few of their hobbies. There are various collecting habits; such as, stamps, bronzes, book

plates, war books, maps, old glass, antique furniture, and so on. Roses, farming, planting trees, country life, flowers, natural history, painting, inventions, mathematics, cabinet making, photography, genealogy, breeding chickens, horses, puzzles, and whittling are other hobbies. Then there are such serious ones as public health, civic betterments, industrial economics, open shop, boy scouts, grandchildren and birthdays of others (see Barney about this). Resting, loafing, smiling, traveling, forgetting how the time flies, minding his own affairs, getting as much as possible out of life without injuring others, theatre, movies, *Saturday Evening Post*, and putting the Port of Boston on the map as the finest are the rest of the hobbies mentioned on the questionnaire. Anyone desiring a hobby should apply to the Class of '91.

Twenty-eight have held public office, including a "dog catcher." Nine have written books and 13 have written technical articles or papers. Seventeen sons have gone to Technology, one of whom is a Ph.D. (Ambrose), four are at the Institute, and two expect to go there. The request for information on foreign travel was probably overlooked or omitted in some cases. The answers, however, show that we have roamed about quite a bit. Canada is eliminated as a foreign country, also Bermuda (for no particular reason). Sixty have visited foreign countries, some more than once; one has crossed the Atlantic 26 times; 51 have visited Europe; 8, Africa; 6, South America; 2, Asia; one, Australia; not including two who have been around the world; 21 have been to Mexico, Cuba, Central America, or the West Indies. One stated that his foreign travel extended to South Boston and another admitted being 100% domestic.

Prizes were awarded for the various sports with a special prize of Cape Cod Cranberry Sauce to Ambrose and Keene, who had not been to a reunion for 15 years or more, presumably as an inducement to come more often in the future. In golf the first prize went to Keene; second, to Blanchard; and third to Fiske. The archery prizes went to Howland, first; Wilder, second; and Ensworth, third. In auction bridge, first prize went to Ambrose and second to Spooner; in contract Bird won the prize.

Sunday morning gave a further chance to visit with those whom we see so infrequently and after lunch we wended our various ways homeward. The Class is indebted to the following chairmen of committees who helped make the Reunion a success: Will Wilder, who took care of the money; Arthur Hatch, who looked after hotel arrangements, meals, and clam bake; Howard Forbes on sports and prizes; Gorham Dana on hats, pictures, porters, and so on; Frank Howard on transportation, his company furnishing the truck for baggage; and Fred Blanchard on attendance. Barney Capen wrote many of the letters and got in the questionnaires, and Eli Bird prepared the drawings for the poster, letterheads, and

1891 *Continued*

programs. It was agreed to prepare a Fortieth Reunion class address book and since the Reunion a special committee has been appointed with Gorham Dana as chairman.

Clifford M. Tyler passed on July 21 at his home in Brookline, Mass., and Douglass, Blanchard, Fuller, Young, and Kimball attended the services. Although he had not been well for some time, he attended our Fortieth Reunion and it was a great pleasure to all of us to see him again. The following is from the Brookline *Chronicle*: "Clifford M. Tyler, a prominent resident of Brookline for many years, died at his home at 219 Buckminster Road in his 61st year. Death followed an extended period of poor health. Mr. Tyler was born in Portland, Maine, but came to Brookline as a boy and was educated in the local schools. Following his graduation from Technology in 1891 he entered the fireplace and tiling business and had since been engaged in that, being President and Treasurer of the Standard Storage Company and Treasurer of the C. M. Tyler Company. He was a member of the University Club and also belonged to the Harvard Congregational Church, in the affairs of which he had been active. A widow, one son, and two daughters survive."

Cliff was a 32nd Degree Mason. His son, Richard, is married and lives at Wellesley Hills. Hanington writes from Denver that he visited Cliff the last time he was in Boston and that Cliff married a girl who lived in Denver at one time. Walter Douglass tells of his friendship with Cliff. They were on the Technology Glee Club and Cliff had a fine bass voice.

Walter Douglass entertained several of his classmates at dinner at his country place, Quick Water Farm, Wilmot, N. H., on July 26. Those who attended were Mr. and Mrs. Charles W. Aiken, Mr. and Mrs. Gorham Dana, Frank W. Howard, and his daughter-in-law. Clifford Tyler was invited but his sudden death occurred only five days before. Walter sent out the most original and attractive printed invitations giving a sketch of the farm, a map of the region, and detailed directions for reaching there. The farm, which he has been improving for some ten years, is a model of attractiveness and efficiency, with well-trimmed hedges, brilliant flower gardens, especially designed fences, and a carefully arranged foret of young pine trees. The party had such a good time inspecting this interesting place that it was late afternoon before they got away.

A Boston paper tells of the sudden death of Gardner F. Wells on August 2. His home was in Westport, Conn., but he spent part of his time in Boston as President of the Lynn and Revere Beach Railway. He was formerly connected with Stone and Webster and later a partner of Albert W. Hemphill of New York in the operation of street railways. He was educated in the schools of Boston and Cambridge and graduated from Brown and Nichols before going to

Technology. He was a major in the Ordnance Department of the Army during the World War.

We recently learned of the death of Tom Creden in March, 1930, and Barney writes as follows: "I was grieved to learn of the death of my dear old friend and chum of my South Boston days at Technology — Thomas Harold Creden. Tom and I saw a good deal of each other in those days, occasionally studied together, and he frequently came to my home. Following our Technology days, Tom went to Chicago and I think was with Louis A. Ferguson '88 of the Chicago Edison Company. I had fine letters from him for a time but I have not heard from him for many years. Tom had a keen, discriminating mind, a distinctive personality, a strong sense of humor, and he was very likeable. I shall remember him with affection."

A letter from Mrs. Thomas Creden to Barney tells of her three boys. She says that Tom was ill a long time. To quote a paragraph from her newsy letter: "I wish it were in my power to write you a sketch of dear Tom's life — but there isn't much that I can tell. I met Tom while he was with Stone and Webster in Sydney, Nova Scotia, building an electric line. Afterwards he was moved to Joliet and was with the Economy Light and Power Company for not quite a year, then he went with H. M. Byllesby and Company, where he worked for about three years, when he was taken ill."

Henry Bradley sends a postal from Venice. All's well and a fine trip. — Robert Ball writes from England and mentions his son going into Colonial Civil Service. He had a visit from two students at Technology who propose to go to Cambridge, England, for a course chiefly in mathematical physics, for which Cambridge is famous. — Charlie Garrison is on his way back from California by auto. He has been away for a year and gets back to Cambridge about September 3. — HENRY A. FISKE, *Secretary*, Grinnell Company, 260 West Exchange Street, Providence, R. I. BARNARD CAPEN, *Assistant Secretary*, The Early Convalescent Home, Cohasset, Mass.

### 1893

Frank S. Badger of London made a short call on some of his Boston classmates in early June, while en route from South America to England. Since 1909 Badger has been associated with J. G. White and Company, Ltd., of London, of which company for many years he has been, and is, chief engineer. This association, especially in its earlier years, caused him to travel widely over the world, largely in charge of the building of hydraulic and hydro-electric works, and in carrying out engineering investigations. Apparently he is as much at home in South America, or Australia, as in London or Paris (where his company maintains a branch office); and the early part of this year, he spent many months in Ecuador. Although much Anglicized, there is no lessening in

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Badger's regard for his native Massachusetts and his fellow classmates at Technology. His permanent address is the office of J. G. White and Company, Ltd., 9, Cloak Lane, Cannon Street, London, E.C.4, England. The Secretary can testify that if one is seeking Badger at the Cloak Lane office, this full address is not unduly explicit.

The following notice relating to the son of our classmate, Edward Page, appeared in the *Transcript* on August 18: "Edward Page, Jr., American vice-consul at Harbin, North Manchuria, recently has been transferred to Paris for Russian language study. Mr. Page, who is the son of Mr. and Mrs. Edward Page of West Newton, was graduated from Harvard in 1928, and, on entrance into the American Foreign Service, was sent to Tokio as private secretary to William R. Castle, and then to Harbin, Manchuria, where he remained for about a year."

Miss Dorothy Rogers, daughter of Mr. and Mrs. Howard L. Rogers of 34 Spooner Road, Chestnut Hill, Brookline, Mass., was married July 30 to Mark Hopkins, son of Mrs. Stevens Heckscher of Strafford, Pa., the ceremony being performed that afternoon at the First Church (Unitarian), Chestnut Hill. Mr. Hopkins is a Harvard '29 graduate, and a member of the Fox, Hasty Pudding, and Philadelphia Racquet Clubs. His bride, a graduate of the Knox School of Cooperstown, N. Y., belongs to the Vincent Club and the Junior League. Following a wedding trip to Lake Louise in the Canadian Rockies, Mr. and Mrs. Hopkins are living in Strafford, Pa. — FREDERIC H. FAY, *Secretary*, 44 School Street, Boston, Mass. GEORGE B. GLIDDEN, *Assistant Secretary*, P. O. Box 1604, Boston, Mass.

### 1895

We have a number of globe trotters in our class, but it appears to be difficult to induce some of them to forward to your Secretary a concise digest for our readers' information. There is one fellow we can always depend on and that is Frank A. Bourne. Frank and Mrs. Bourne tripped to the tropics for a vacation, including a sketching and painting cruise, and we are glad to give you a short story of his experience. He writes: "This February was lost from the customary winter calendar and spent in a fronded isle of the Caribbean. You may like to know why a Bostonian should sail from Philadelphia. In this case there were three reasons: we had been on the good old S.S. *Republic* and knew how comfortable she was; we saved two days of traveling by going down by rail; and (this we did not know until afterwards) we saved some very stormy days just outside Boston harbor. As this was one of a series of five round trips from Philadelphia, we stayed over one interval on the island of Jamaica, our first experience in the tropics. The sailing was evidently an event, for it was announced in electric lights on the front of City Hall and a large crowd, assisted by the noisy munic-

1895 *Continued*

ipal mechanical band wagon, had come down to the pier to see us out of Philadelphia. — In Nassau they detained us two hours and we caught a glimpse of what might have been Columbus' Island in 1492. Day by day the officers changed gradually from navy blue to snowy white and the passengers from winter to summer clothing. The bathing suit was useful — in the ship's tank, the tiled pools at Myrtle bank and Bournemouth, over the gleaming sand of Port Antonio, on the sandy beaches, and under fresh water falls at Dunn's River, at Shaw Park, and at Montego Bay (where you go down steps to the roof of the cave and swim out into the sunlight of the Caribbean). There they have not seen a shark for ten years, but then, you never know what might happen!

"Around Port Royal, refuge of the buccaneers, we sailed into Kingston Harbor, overlooked by beautiful Blue Mountain rising behind the city. We were marooned there and had to return in a pilot boat. It was reported in *The Kingston Gleaner* as follows: 'Mr. and Mrs. Bourne of Boston, visitors to Jamaica, went to Port Royal yesterday in a private motor launch to paint scenes of the historic place. They spent an interesting and profitable day; but to their dismay found at six o'clock in the evening that they were without any means of transportation back to the city. They were unable to get passage by the W. D. Water transport launch as they had no passes. Luckily for them, the pilot launch *Kingston*, which Pilot Gray used in taking out the S.S. *Duchess of Richmond*, went to their rescue, took them on board, carried them out to the Plumb Point Lighthouse, and on its return landed them at the Victoria Market Pier at about eight o'clock. . . .'

"We did the usual stunts, spent a night at the Myrtlebank Hotel, motored over the pass a mile up past Newcastle and down to the entrancing Hotel Titchfield. The dining-room has no glass windows, no need of even a mosquito screen. The arches frame beautiful views out over Port Antonio harbor. Summer clothing is customary in Jamaica's winter. We rode the rapids of the Rio Grande on a bamboo raft; and on the road around the eastern point of the island, where we got stuck fording a river, we got a glimpse of the Blue Hole.

"We established our headquarters in an old planter's house, typical of the Eighteenth Century, leaving our heavy bags there while we made trips to Ocho Rios, Shaw Park, Mandeville, Bog-walk, and Spanish Town. We drove out via 'Fern Gully,' Roaring River Falls, and returned the next day via the Bamboo arch. The north side offered the most subjects for sketching and photography. Cocoanut palms overhang the water and native huts fit appropriately into the tropical landscape.

"Kingston was gaily decorated when we arrived, but we found it was not for us, but for the Prince of Wales who was due the next day. We saw him arrive

from the dock of the United Fruit Company, which owns a good deal of the landscape, and were told that we were standing on United States soil. We saw the Prince and his brother, Prince George, again at the Liguanea Club polo field and at the new Constant Spring Hotel. — A million colored inhabitants to 20,000 whites has some effect on the appearance of the crowds, and it is surprising to be the only white man on a street car. At every turn of the road you can see a figure carrying a basket on the head and everyone wears a brilliant colored bandana.

"We were disappointed in not flying from the Pacific to the Atlantic as a freight wreck on the Panama Railroad delayed the program, but we were surprised at the liveableness and comfortable appearance of the canal zone. 'Jai-Alai' was the most striking thing that we saw at Havana; and Philadelphia welcomed us from a trip that had seen only flawless weather and the smoothest of seas.

"Two trips to the tropics in one year seems almost too good to be true, but an architects' convention in San Antonio, Texas, brought us too near to Mexico to resist, so that we had 11 days there including Cuernavaca, Taxco, and Puebla. Here is wonderful sketching country and if you do not mind the high altitude and some dust crossing the plains, it is a marvelous country for a vacation. It was fine to be present at the fourth centenary of the founding of the City of Puebla in 1531, just when we had but recently recovered from a Boston Tercentenary. We left Mexico City Tuesday evening and, with only one change of cars, arrived in Boston Saturday in time to see the Technology eight rowing against Harvard and Princeton on the Charles River."

Many of our readers have not had the pleasure of knowing more intimately our genial mate, Al Sloan, Jr. Al has always been a modest fellow, still is, yet intensely interested in business as well as his class. He promises to be on hand at our next reunion and your Secretary will see that he appears. We quote from a clipping taken from the Hamilton (Ohio) *News* referring to an interview by Irving Bachelor: "The other day I went to see Alfred Sloan, at the head of a new industry. It is, no doubt, the greatest single factor in the mighty physical changes that have come in my time. If I remember rightly, there are 200,000 men and women in the great army which he commands. He is a slender, human dynamo, a little under medium height. One feels the nervous energy of his spirit in his gray eyes, in his restless moving as he talks. 'I am a problem-a-minute man,' he says as he rises from his chair. His secretary has just announced that San Francisco is on the wire. Quickly he returns and sits down in that revolving chair. I was his next problem. He had to get it out of the way of others. 'The truth is, it was good luck that put me in this job,' he began. 'My father was a wholesale merchant in New Haven, Conn., and fairly well off.

I had a taste for mathematics. Wanted to be an engineer. Went to Massachusetts Institute of Technology. Came home at last looking for something to do. A friend of my father was interested in a new invention. It was a roller bearing. I took hold of it. Then along came the first motor cars. They needed the bearing. So you see, it was nothing but good luck that put me in the way of success.' Here is a type of honest frankness which I enjoy. It was graced with modesty. He allowed nothing for the vision and the tremendous energy transformed into skillful driving power which had built up a vast enterprise. 'What is your favorite amusement?' I asked. 'Business,' he answered. 'My only exercise is in this problem-a-minute. Going to the telephone and returning, going to meetings, going home and coming back. I know that I should get away from it, change my pace. I have built a big yacht which can make any port in the world. There are about 50 men on her. I had hoped that I could coax myself away from business with this plaything. It hasn't worked. I rarely go aboard and the captain is out of patience with me.' 'What is your great problem?' I asked. 'The reduction of costs,' he answered. 'Better service at a lower price.' — There is just one thing certain. If Al will not use his yacht, we might induce him to loan it to us for a reunion. Some reunion!"

John H. Gregory, consulting engineer and professor of civil and sanitary engineering at Johns Hopkins University, Baltimore, has a number of reprints of his article which appeared in the *Engineering News-Record* of May 21, 1931, entitled "Long-Range Planning Essential in Developing Municipal Utilities." John will gladly mail you a copy; if interested, write him.

Maurice Le Bosquet, V, of Drexel Avenue, Chicago, announces the marriage of his daughter Lois to Mr. Ernest Charles Gray of Honolulu, on the 16th of May last.

We regret to report the passing on of Maurice King Washburn, of East Greenwich, R. I., on February 9, 1931. Also of Dr. Mary Josephine Beede, VII, of 2021 Oakdale Street, Pasadena, Calif., on June 16, 1931. Dr. Beede was a physician for some years practicing in Pasadena.

We finally found Harry Sheafe. Harry can be reached at 1122 Hearst Building, San Francisco. — James Humphreys, formerly of New York City, is now living at Sharp Hill Road, Wilton, Conn. — George Defren, V, of Park Street, Newton, Mass., announced the engagement of his youngest daughter Lucile, to Franklin Atwood Park, Jr., of Park Avenue, New York City. Mr. Park is the son of Franklin A. Park, II, '95.

The '95 questionnaire will soon be in the mail. Do not fail to look it over. — LUTHER K. YODER, *Secretary*, Chandler Machine Company, Ayer, Mass. JOHN H. GARDINER, *Assistant Secretary*, Graybar Electric Company, Graybar Building, New York, N. Y.

1896

The big event to report is the celebration of our Thirty-Fifth Anniversary at East Bay Lodge in Osterville, June 18 to 21 inclusive. The golfers got away from Boston early in the forenoon of Thursday, June 18, but 12 men gathered for lunch at the Engineers Club and motored to Osterville. These men had the opportunity to meet Mrs. Palmer and her son Edwin at the club after lunch and see for themselves how well the boy was getting along.

By Thursday night over 30 had arrived. The total attendance, including ladies and guests was 60, not counting Woody's parrot: Mark Allen, Butler Ames, Billy Anderson, Harry Baldwin, Ed Barker, Dan Bates and Mrs. Bates, Dave Beaman, Skip Brackett, George Burgess, Buster Crosby, Fred Damon, Bob Davis, Jim Driscoll, Joe Driscoll, Myron Fuller, Henry Grush, Henry Hedge, Will Hedge, Frank Hersey, George Hewins, Clark Holbrook and Mrs. Holbrook, Perry Howard, Sam Hunt, Henry Jackson, Elbridge Jacobs, Joe Knight, Charlie Lawrence, Gene Laws, C. E. Locke, Charlie Moat, Charlie Morris, Charlie Nevin, Karl Pauly, Myron Pierce, John Rockwell, Bill Root, LeBaron Russell, Henry Sears, Sam Smetters, Jim Smyser, Bradley Stoughton, Walter Stearns, Meyer Sturm, John Tilley, Harry Tozier, Charles Tucker, Lucius Tyler, Perl Underhill, Henry Waterman, Sam Wise, Julian Woodwell and Mrs. Woodwell, and Con Young and Mrs. Young. Woodwell also brought four guests: Mrs. Woodwell's mother, Mrs. A. S. Washburn; his secretary, Miss M. V. Anderson; his pilot, Robert G. Chew; and William C. Tucker. Woodwell flew over from New York and kept his plane available all through the Reunion for all who wished to take a flight, a privilege which many took advantage of and for which we were under great obligation to Woody and his expert pilot, Mr. Chew. Mrs. Young made her maiden flight and was so enthused that Con will undoubtedly have to provide a plane for her future travels. Woody also brought his parrot by plane and the bird gamboled freely on the boys.

Five of the foregoing men made their initial appearance at a reunion but promised that they would not be missing in the future. They were Burgess, Holbrook, Morris, Russell, and Waterman. One man, Bert Thompson, who had never missed a past reunion lost out this year by a combination of circumstances which he could not overcome. This now leaves an old guard of five who have had a perfect attendance at all reunions: Grush, Hersey, Locke, Rockwell, and Wise. It was a pleasure to greet Smetters who arrived unexpectedly, after having reported previously that he could not come.

The new Technology flag, designed by the Historical Committee of which Henry Jackson is a member and the man who does the work, was on display and formed a fine background in the dining room. — According to our usual custom no set strenuous program was laid out,

but each followed his bent of golf, flying, motoring, bridge, and talk. Many took advantage of the hospitality of Con and Mrs. Young in their delightful new house at Bass River.

At the class dinner Saturday evening, June 20, after host Brown's delicious food had been tucked away and Perry Howard's cigars lighted, the meeting was called to order. The reading of the Secretary's report was omitted by unanimous vote. Detailed figures showed the various funds of the treasury to be in a very solvent condition. Various messages of greeting were read from the absent ones, including a cable from Arthur Baldwin in Paris, and a wire from Paul Litchfield, who had been summering at Green Harbor and had planned to be with us but was prevented by business which called him back to Akron. Orville B. Denison '11 sent personal greetings and those of 1911 who were about to celebrate their Twentieth Anniversary at Douglas Hill, Maine. Charlie Hyde wrote on June 10 as he was nearing Honolulu and his letter arrived just in time for the dinner. He and Mrs. Hyde were on their way to Japan, he being a member of a commission to study the sanitation of ships as related to the transportation of steerage passengers from the Orient. They went on the *President Jackson* of the Dollar Line and after eight days in Japan were due to return on the *President Wilson*. His studies dealt especially with ventilation.

Next on the program came two solos by Con Young in lieu of songs by the old '96 quartette, which was unable to function due to Leighton's absence. He was in splendid voice and was finely accompanied by Mrs. Young on the piano. Formal vote of thanks was given to Woodwell for the airplane trips which were so much enjoyed. It was also voted to send class greetings to Wayne who was still in the hospital, and a silent toast was drunk to the men who had passed away during the year including Ben Hurd, George Merryweather, Ted Jones, Charlie Morrill, and William Nagle.

Charlie Brown, our genial host and proprietor of East Bay Lodge, and his efficient staff were formally thanked for the fine service received, and as a token of our appreciation, he was unanimously elected an honorary member of the Class of '96, to which he responded with a very fitting verbal bouquet. There was then nothing to be done but vote to hold our Fortieth and all succeeding reunions at East Bay Lodge as long as Brown continued to run a quiet, restful resort. The next honor was the award of a prize to Laws as the long distance man coming from Salt Lake. The result of the golf tournament was announced and the prize of six golf balls awarded to the winner, Henry Jackson. Rockwell gave a report of the physical progress of young Edwin Palmer and this boy's case was talked over very fully with the result that it was finally voted to increase the annual class allotment for his benefit to \$250 and to circularize the class for annual voluntary contributions for this purpose. The climax of the evening was a very interesting

and intimate talk by Dr. Burgess on his Japanese trip and the work of the U. S. Bureau of Standards under his direction including high commendation of Dr. Compton as President of Technology.

Unforeseen circumstances prevented the attendance of an unusually large number of men who have been with us in the past and who had fully expected to be on hand this year. William Haseltine, after planning for a whole year, could not fit his Eastern trip to visit his boy at Technology so as to come to the Reunion also. — Lou Morse with Mrs. Morse was in Cambridge for commencement exercises when their son graduated, but could not stay over another week for the Reunion. They motored back by way of Osterville to see Buster Crosby and stayed with Con and Mrs. Young at Bass River. — With Dorrance, who is now assistant to the chief engineer of the New Haven Railroad at New Haven, it was a case of college dates interfering. His family is growing up and all three of his boys had graduation doings in June. — Will Coolidge had to take part in a symposium at the June meeting of the American Academy for the Advancement of Science in Pasadena.

Fred Fuller and Harry Fisk kept up hope until June 16 when they wired that it was impossible to get away. — Howe as Vice-President of the American Society of Civil Engineers had to attend a Board meeting in Tacoma between June 21 and July 6 and could not see his way clear to jump from Texas to Boston and then from the Atlantic to the Pacific and thus be away from his business for a month. — Marsh Leighton moved his office the first of June to be with the Electric Bond and Share Company at 2 Rector Street in New York City. However, the Vice-President of this company arranged to let Leighton off over the week-end but an emergency call to make a trip south upset the plans. — Irv Merrell was all set but had a kidney attack just prior to the Reunion which laid him up for two or three weeks. — Charlie Paul had to take a three weeks' trip to the Pacific Coast the first of July so that he was tied up in June getting his business in shape to leave.

Clem Tower promised M. L. Fuller to come with him but backed out. He is head of the Plymouth Rock Gelatine Company and expected to retire but has been unable to do so owing to the death of his partner. Fuller says he has little left of his old football head of hair. — Fred Crosby had to give up at the last minute and sent best wishes with an invitation for the boys to drop in on him at the Lott Hotel Company office in Chicago. — Bert Spahr had a family reunion to celebrate his fifty-eighth birthday which kept him away. — Eddie Mansfield was probably the most disappointed man as all his plans went awry on account of an automobile accident. Another car ran into his daughter the day before our Reunion and she went to the hospital, so Eddie did not feel that he could leave her. Her injuries were largely internal and proved to be rather serious so that she was in the hospital over a

1896 Continued

month. The last word was that she was back home and seemed to be well on her way to recovery.

Eddie Bragg had the misfortune to lose his wife who passed away on May 9. She had been an invalid for several years. Prior to her marriage in 1907 she was in charge of the Barbour Gymnasium for Women at the University of Michigan and took a deep interest in student welfare. Interment was at Gloucester, Mass., on May 13. All missed Eddie at the Reunion and sympathized deeply with him.

Skip Brackett, now on the retired list, lives in Hingham in the summer and in Fort Myers, Fla., in the winter. — W. L. Root's son is the '96 Class Scholarship man as freshman at Technology this year. At Williston Academy he won his letter on the track team for mile run in 1930 and 1931, was elected to Cum Laude Society, and was Class Valedictorian at graduation. — E. H. Barker, who is professor of textiles in the Lowell Textile Institute at Lowell, returned from a professional trip to Europe early in June and was scheduled to go back at an early date, but he showed a commendable example by dropping all work June 18 to 21 inclusive.

Butler Ames is having a good time developing electrical specialties for the Heinze Electric Company in Lowell. He told at the Reunion about his experimental airplane and gasoline engine, both using entirely new principles. — Walter Leland reported that the phrase "could not see his way clear to come to the Reunion" was literally true as he was just out of the hospital after an operation for acute glaucoma and could not see his way clear in more ways than one. This was his second trip to the hospital in a year for surgical operations and other fixings. — Jim Melluish in Barranquilla, Colombia, suggested that next time we should meet there and promised an old time Jakie Wirth show with steins of real five per cent.

Julian Woodwell and Mrs. Woodwell fell in love with Bass River and bought the lot across the street from Con Young. Woody plans to build a house, buy a boat, and take life a little easier. — The second edition of "Working Drawings of Machinery," of which Professor Walter James is co-author with Malcolm MacKenzie, appeared in June. — Joe Pillsbury, who is the manager of the Pacific Stevedoring Company at Prince Rupert, B. C., had the pleasure of entertaining Dr. Compton for a few hours there one day early in July and reported that he was deeply impressed with the charm and ability of our President. On the other hand, Dr. Compton said on his return that Pillsbury was one of the most interesting men he had met on his entire western trip.

Howard K. Jones, who died January 21, 1931, was apparently in fairly good health up to about a week before his death. He left his office for Erie, Pa., one evening, and was taken ill upon his arrival. He was immediately taken to the Hamot Hospital, where his illness was pronounced pneumonia, and he passed

away within a few days. Jones was born in Erie, Pa., May 7, 1873, and ever since his graduation from Technology he has been connected with the architectural firm of Alden, Harlow and Jones, in the Farmers Bank Building, Pittsburgh, Pa., and at the time of his death he was senior member of the firm. He had become one of the most widely known architects in western Pennsylvania on account of his contributions to the design and supervision of many private, public, and semi-public buildings in the Pittsburgh district and the northwestern part of the state; among them the Farmers Bank Building, Carnegie Institute and Library at Schenley Park, several branch libraries, the South Hills High School, the Wilkinsburg Masonic Building, the Mutual Telephone Building, the Luther Memorial Church of Erie, the R. B. Mellon residence on Beechwood Boulevard, and many residences in Sewickley, Pittsburgh, and Erie. He was an active member of the American Institute of Architects, a past president of the Pittsburgh Chapter of that society, and had just been re-elected to membership on its board of directors the day prior to his death. He was a member of the Union Club of Pittsburgh, Edgewood Country Club, the University Club of Erie, a member of the South Avenue Methodist Episcopal Church of Wilkinsburg, and a 32d degree Mason. The burial was in the Erie Cemetery. He leaves a widow, Eva Williams Jones, and one son, Robert Howard, of New York City.

Justin W. Campbell died at Canton, Ohio, on April 20, 1931. He had a very serious illness two or three years ago, but apparently recovered, and reported that he was feeling fine. The fundamental organic trouble, however, still persisted, and a complication developed, including Bright's Disease. Although he was at his work regularly up to April 18, he had an attack that day and was taken to the hospital where he lapsed into unconsciousness, and passed away two days later.

Campbell was born December 1, 1874, in West Roxbury, Mass., the son of John H. C. and Caroline (Huse) Campbell. From 1896 to 1916 he was with the Pennsylvania Steel Company at Steelton, Pa., on metallurgical and inspection work, and toward the latter end, in charge of inspection. From 1916 to 1919 he was assistant metallurgist and inspector for the Pittsburgh Crucible Steel Company at Midland, Pa., making a specialty of alloy steels and munitions. From May 1919 to 1922 he was superintendent of production for the Cromwell Steel Company at Lorain, Ohio; and from 1920 to 1925, purchasing agent of the Interstate Foundry Company at Cleveland. For the past few years he had been with the Union Metal Manufacturing Company at Canton, Ohio. He never married. We always remember Campbell as a cheery and energetic chap, characteristics which persisted through his life. — CHARLES E. LOCKE, Secretary, Room 8-109, M.I.T., Cambridge, Mass. JOHN A. ROCKWELL, Assistant Secretary, 24 Garden Street, Cambridge, Mass.

1899

An appeal in the July issue of The Review for news of missing men drew a note from Clifford M. Balkam who informed me that he is still alive — just! and going into his 27th year in the office of Henry Sachs, stocks and bonds, Colorado Springs, Colo. He invited me, and incidentally all of the rest of the Class of '99, to "come out to God's country sometime and see things!" Some of us may surprise him by accepting one of these days.

From Indianapolis comes the news that G. F. Atkins of E. C. Atkins and Company has won a prize. The prize is a new Plymouth car and he won it by devising a 20-word slogan for the American Cigar Company, manufacturers of Cremo Certified Cigars. Atkins tried three times before he won, and therefore he thinks the third trial at anything is lucky. All he could say was that he was flabbergasted, though he admitted to the presentation party that he needed a new car, for his regular conveyance for 12 years had been a Stanley steamer with a leaky boiler that kept a man busy carrying water. In addition to the car, Atkins was presented with a tank of Mobiloil from the Vacuum Oil Company; the Cremo people gave him a full box of cigars to treat his friends who were ready to help him rejoice in his good fortune, and the State Automobile Insurance Company presented him with a covering policy. And there are still some people who say there ain't no Santa Claus! Atkins is planning to drive East in the new bus and look me up, and incidentally visit his son, who is an architect in Philadelphia and graduated from Pennsylvania College recently.

From Seattle comes the news that the Bacon and Matheson Forge Company has been purchased by the Pacific Car and Foundry Company, and W. Scott Matheson will become manager of the forging department. He was Vice-President and General Manager of the Bacon and Matheson Company from 1918 until the merger was effected recently.

W. E. Parker of the *Hydrographer*, one of the Coast and Geodetic Survey vessels engaged in the first complete charting of Georges Banks, has described a whirlpool in the Atlantic, 150 miles east of Cape Cod, so strong that it repels a ship. He knows because he tried to run his ship through it. It is unique in that it spins outward instead of toward the center. Parker thinks it will bear closer examination and when he has finished charting Georges Banks, the happy hunting ground of fishermen, he will return to the whirlpool and see what it is all about. We hope to hear something of this later.

Bassett Jones has adopted shellfish as a hobby. He is quoted as saying "a thousand times more I would prefer to have a hand in boosting Nantucket fisheries than in winning the Vineyard Inter-Club Cup. My water hobby is shellfish — other men may prefer yacht racing." Jones has made a study of the scallop and has found that seed, to be moved alive, must be kept wet and not allowed to dry. Neither must it be moved into deep

1899 Continued

water. Moved into shallow water, the larger seed gradually work off to a proper depth and all the seed are properly suited. Nantucket is fortunate to have so loyal a summer resident whose hobby is so profitable to Nantucket.

Lew Emery, after deciding he wouldn't, suddenly decided he would and left hastily in July for the Dalmatian Coast. He wrote me from Ragusa that he was stopping there en route to points East — how far East he did not say. — We are still in the Nine Issue Club and I trust that someone will be charitable enough, several someones in fact (for a column is more than a paragraph), to send in material for the next issue. — W. MALCOLM CORSE, Secretary, 810 Eighteenth Street, Washington, D. C. ARTHUR H. BROWN, Assistant Secretary, 53 State Street, Boston, Mass.

#### 1900

Rev. and Mrs. Addison Caleb Bird announce the marriage of their daughter, Dorothy Ida, to Mr. Harold Stuart Price, on Saturday, May 2, 1931, Clifton, N. J. Harold Price will be remembered as the son of P. L., IV, and who had such a good time at our Thirtieth Reunion at Osterville.

Chicago Sunday Tribune of May 31 has a notice about our old friends: "Frank D. Chase, president of Frank D. Chase, Inc., architects and engineers, last week was installed as president of the Western Society of Engineers. Mr. Chase, prominent in Chicago architectural circles for many years, is a graduate of the M. I. T. and a member of the American Society of Civil Engineers. . . . Leigh S. Keith was re-elected treasurer."

After many years out of touch with the class we hear from Arthur Constantine, IX, with an address Edificio Condesa, D-4, Mexico City, Mexico. — Word has just been received that Rawson Collier recently was elected vice-president and general manager of the Alabama Natural Gas Corporation and the Mississippi Natural Gas Corporation with a new address at 904 Webb Crawford Building, Birmingham, Ala.

In July the sanctum was brightened by the appearance of Keith, on from Chicago for a short stay. He looked the picture of health and wished to be remembered to all his old friends. — One of the June weddings of particular interest to the members of our class follows: Mr. and Mrs. Samuel Ingersoll Bowditch (Marion Percy Rogers), who were married in Christ Church, Cambridge, will sail for Peru on July 4, where they will make their home for a year and a half. Mr. Bowditch will continue his work there as geologist for the Cerro de Pasco Copper Corporation near Oroya. — The bride, the daughter of Mrs. Lucian W. Roge's of 5 Fuller Place, Cambridge, and the late Rev. Lucian W. Rogers, is a member of the Junior League and was graduated from Smith College in 1928 after first attending the May School. Recently she studied at the School of Fine Arts. — Mr. Bowditch is the son of Mr. and Mrs. Ingersoll Bowditch of 32 Woodland Road,

Jamaica Plain. He was graduated from Harvard in 1928, is a Phi Beta Kappa man, and a member of the Phike Club. — The matron of honor at the ceremony was Mrs. Horatio Rogers of Newton Centre, and the maid of honor was Miss Silvia C. Bowditch of Jamaica Plain, sister of the groom. The bridesmaids were Miss Susan M. Cabot of Brookline and Miss Priscilla Waterman of Chestnut Hill. Henry G. Balch of Cambridge was best man. — C. BURTON COTTING, Secretary, 111 Devonshire Street, Boston, Mass.

#### 1901

The news of the Thirtieth Reunion has already been circulated through the mail, so there is no particular point in dragging forth the grim details of that particular orgy. Furthermore, the present attitude of the editors of this journal is such that I refrain from sending in all debatable literature. You need only refer to my note of the last issue to realize the unfortunate position taken by the editorial board. It is unnecessary for me to say more.

Most of the information that has reached me during the summer has come through the channel of the daily press. As I have not as yet had that flood of data sheets containing "information of interest concerning myself or some other 'Ol man,'" I have been constrained to use this not entirely authoritative source of information. Curiously enough, however, a number of very interesting items have reached me, in part through my own assiduous study of the journals, in part through the kindness of the few faithful members of the Class upon whom I can always depend. (Page Philip Wyatt Moore.)

The first that reaches my eye is that Anna Gallup, who is curator-in-chief of the Children's Museum in Brooklyn, on one given calendar day washed 1,228 pairs of hands; at least, that is the statement made in the newspaper. Now I have done a little figuring as to the number of hours during which the Museum is open, and the number of pairs of hands, and all I can say is that Anna is a quick worker. Incidentally, she has already had notice in these notes, particularly last year when she received the Gold Medal of the National Institute of Social Sciences. Again, incidentally, Anna is running a large show, and the same newspaper article which brings the news of her hygienic precautions also states that over half a million people a year visit the Children's Museum in Brooklyn. Anna did not wash them all. It is a big educational force in the community and the developments of the past 25 years are largely due to our classmate's interest, initiative, ability, and hygienic apprehension. With this record of her efficiency, I would suggest to those of you who are over-burdened with family cares, particularly in the form of grandchildren, that they (the grandchildren) be tagged and sent on to Anna. At least they will be kept clean no matter what else happens to them. Those of you who are really interested will find the article in the Brook-

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lyn Standard Union of May 24, 1931. It filtered into my office considerably later than the time of its appearance, but it is none the less authentic and reliable.

The next item which reaches me through the daily press, or at least through the lay press, is an article in *Time*, the issue of July 20, dealing with the Bahá'í movement. I find to my great interest and surprise that Allen McDaniel of Washington is the chairman of the United States and Canadian movement. I excerpt a small part of the article, which is extremely interesting and describes the activities of this religious sect in the United States and elsewhere.

"In the Temple last May met Bahá'í's 23d Annual Assembly. Quietly, with little ceremony, 95 delegates from 50 local Bahá'í communities elected a board of nine directors for the year. Chairman and head of the United States and Canadian movement is Allen Boyer McDaniel, Washington engineer. The organization is simple; there is no proselytizing. People may join (and contribute money) of their own volition. Some who have shown interest are King Zog I of Albania; Count Ilya Tolstoy, son of the late great novelist; Mrs. Lewis Stuyvesant Chanler, wife of New York's one-time Lieutenant Governor, whose daughter was married in a Bahá'í ceremony (*Time*, March 10, 1930); Solon Fieldman, one-time Socialist leader; Dowager Queen Marie of Rumania." Among the other distinguished members of the order, I note particularly the name of Dowager Queen Marie of Rumania. This fact will certainly be of interest to members of the instructing staff at the Institute who have had contact with this volatile lady whose later exploits have done so much to keep her in the public eye.

Another sending is the Picatinny Arsenal Barrage in which the leading article is devoted to our classmate, Joseph D. Evans. I am excerpting from this a few of the more salient points connected with Joe's leading activities. Those who have enjoyed his genial hospitality recognize in that a reflex of his more serious professional concern.

"Mr. J. D. Evans, one of the country's foremost war-time ammunition loading plant personalities, spent several days during the past month visiting the Arsenal. Mr. Evans' long and varied experience in the financing and creation of extensive industrial developments, mining operations, and public utility enterprises enabled him to enter into the design, construction, and operation of ammunition loading plants during the late war; his imposing war record including the following accomplishments:

"1. The manufacturing of all component parts including gauges, for 2,500,000 complete rounds of 3" Shrapnel and 2,500,000 complete rounds of 3" Shell for the Russian Government during the years of 1915, 1916, and 1917, together with the loading of said rounds.

"2. The design, construction, and operation of the Shell Loading Plant of the Evans Engineering Corporation, Old Bridge, N. J., on the loading of 3" and 75

1901 *Continued*

mm. Shell for the Ordnance Department, U. S. A.—years 1917, 1918, and 1919.

"3. The design, construction and operation of the Shell Loading Plant and town site of the Atlantic Loading Company, Amatol, N. J., for the Ordnance Department, U. S. A.—years 1917, 1918, and 1919.

"Mr. Evans has continued his interest in loading plant activities by keeping in contact with the Ordnance Office and by personal visits to Government plants, and by maintaining his membership in the Army Ordnance Association. His industrial activities include the presidency of the Evans Engineering Company of New York, and investigate work for improvement in large plant operations." Joe, the ever faithful, was one of the group who gathered for the Thirtieth Reunion. During the entire several days which we spent together nothing was said of ammunition. This was an oversight on Joe's part which I hope will be repaired at the time of our next reunion which, for those who are not already informed, will be at the end of only a two-year period; in other words, early in June of 1933.

It is my sad duty to record the death of George W. Carter, VI, 124 Glenville Avenue, Allston, Mass. I regret that at present I have none of the details but shall endeavor to secure them for the next issue.

By the time it becomes necessary to prepare my next communication, I shall undoubtedly have heard from the great majority of the Class, and shall thus be able to give you first-hand information concerning the doings of a large part of our group. For those who did not attend the Thirtieth Reunion, may I say that it was an entirely successful affair and that we plan to repeat it, as noted above, in 1933. It would be well to begin to save your pennies now, as I presume a lack of pennies was a factor in the small attendance. This does not imply that all of those who attended were wealthy beyond the dreams of avarice, because I was there myself. It is unnecessary for me to elaborate upon these painful, personal details. Further, Johnnie McGann took me down and Ned Seaver brought me home "collect," so that I was able to take part in the party with a relatively small outlay.

There is but little more to chronicle at present. This being the height of mid-summer it is, I presume, appropriate for me to wish that you all have thoroughly enjoyable summer vacations and that you read carefully all of the literature which is even now coming to you through the mail from your Class Secretary.—*ALLAN W. ROWE, Secretary, 4 Newbury Street, Boston, Mass.*

### 1903

The sad duty devolves on us to report two deaths in the class. R. T. Wilder, III, was killed when a train struck his automobile near Clearwater, Fla., on April 12. He was a mining engineer and spent most of his life since leaving Technology in Mexico. The sympathy of the Class is extended to his family. His son is a senior at the Institute this year.

—J. F. Doran, II, died at Hartford, Conn., on July 12, following a nervous break-down from which he had been suffering for three months. He was with us up to the third year, when he left to go into the hat machinery business with his brother. The rest of his life was spent in Danbury, Conn., where he not only built up a business which is known wherever hats are manufactured, but built himself into the life and affection of his city. He was a member of a large number of civic, state, fraternal, and national organizations. Jim was married in 1905 and besides his widow, he leaves four children. The Class extends to them its sincere sympathy.

Beverstock I, spent part of the summer in and around his old home town, Keene, N. H., and his son was married there on August 14. — The Secretary has been in Europe most of the summer; it is possible that he will have some interesting things to tell us when he returns. He is not expected back before the middle of September. — The Assistant Secretary became a grandfather on July 4. Possibly other members of the Class have already attained that dignity, but it is a reminder that we are "getting on."

The following members and wives attended the Annual Dinner at the University Club on June 18: C. S. Aldrich and Mrs. Aldrich, F. A. Eustis, and J. A. Cushman. Several others expected to come but were prevented at the last minute. An enjoyable evening was spent talking over old and present times. Suggestion has come from Potter and Morse that the Thirtieth Reunion be held in the Middle West—Chicago or Indianapolis, but in view of the much larger number of classmates living in Boston and New England, the sentiment was to arrange a meeting place between New York and Boston, New London being suggested. A note of sympathy was voted to be sent Mrs. Doran, expressing regret that she and Doran could not be present owing to his illness.

Notices sent the following members of the Class were returned undelivered. The Secretaries would appreciate any news as to the whereabouts of George V. Broome, George C. Danforth, Ralph W. Eaton, E. D. Forbes, Henry G. Harris, E. E. Hoxie, and Miss Edna C. Stoddard. — Both Potter and Sam Porter appear in the scientific news. The former as Chairman of Arrangements for meetings of the Society for the Promotion of Engineering Education at Purdue, and of the International Meeting on Applied Mechanics, both in June. Porter was elected President of the Engineering Institute of Canada, and the March, 1931, *Engineering Journal* carries his portrait together with a fine article about him. Congratulations! — At the First National Meeting of A.S.M.E., Applied Mechanics Division, held at Purdue, June 15–16, A. A. Potter was toastmaster at the Monday evening dinner held in the Memorial Union, with an attendance of 170. — FREDERIC A. EUSTIS, *Secretary, 131 State Street, Boston, Mass.* JAMES A. CUSHMAN, *Assistant Secretary, 89 Broad Street, Boston, Mass.*

### 1907

Please note that Bryant Nichols, Secretary, has changed his home address to 19 Rowe Street, Auburndale, Mass.

John G. Barry, consulting mining geologist and engineer, 609 Mills Building, El Paso, Texas, has been appointed President of the Texas College of Mines and Metallurgy at El Paso by the Board of Regents of the University of Texas. This is a new departure in the history of the College of Mines in that it gives this institution a President of its own for the first time in its annals. It may be called later the Texas College of Mines and Arts.

While John has been actively engaged as a consulting mining geologist and engineer since leaving his position as chief geologist with the American Smelting and Refining Company in 1924, he previously taught, first in the geology department of the University of North Dakota, 1907–09, and later at Technology, 1916–20. His work at the Institute was interrupted during the World War by service overseas, where he became a lieutenant colonel in the chemical warfare service and was in charge of gas defence.

John has already assumed the duties of President of the college, but will continue his consulting practice on a limited scale and as far as the interests of the college permit. Plans are under way for an increase in the scope of the school and for enlarging the faculty so that a four-year academic course as well as the four years in mining engineering, may be given. An increased enrollment from families in search of favorable climatic and health conditions is expected. Every effort will be made to develop the college along the best academic and engineering lines to satisfy all requirements. It is hoped to make the institution, ideally situated at the mining metropolis of El Paso, one of the leading mining schools of the country.

H. J. C. MacDonald is chief mining engineer consultant of the Giprosvetmet in the projection, administration, and exploitation of mines and plats in the U.S.S.R. He is also chief mining engineer consultant to the Zvetmetzlo, the control organization for all the mining trust, and a member of its technical council. His address is Hotel Savoy, Rojdestvencia 3, Moscow, U.S.S.R.

C. J. Trauerman, Butte, Mont., in addition to his other duties, has been appointed as consulting engineer for the California-Alder Gulch Corporation, operating in the Tabacco Root Mountain, a mill south of Virginia City, Mont.

As the result of an item which appeared in the July issue of *The Review*, Frank MacGregor wrote me this: "The du Pont Company is in a variety of types of business, but I had to smile at the new one you handed me in the last *Review*. Apparently the printer misread your copy, as I find I am in the du Pont *Razor* Company. Incidentally, we have moved from 2 Park Avenue to the 11th floor, Empire State Building." Of course the company is the du Pont *Rayon* Company.

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Miss Susan Anderson Moller, daughter of Kenneth Moller, was married on June 24, 1931, to Mr. Paul Brooks, of Cedarhurst, Long Island, Harvard, 1931.

As the final item of notes for this issue, we have to record the death of Nathan A. Middleton, on May 4, 1931. Kenneth Moller, who was Nat's intimate friend, sent us the following letter: "It is hard to be original in a letter of this sort but I just have to write a few lines about Nat Middleton, who died this spring. I knew him and loved him, as did everybody who knew him. There just isn't any explanation as to why a man like Nat should be taken, but there is ample reason for his being remembered. I think some of his classmates would be interested in being brought up to date on his life."

"He was born in Louisville, Ky., in 1887 and, as you know, graduated from the Institute in 1907. After graduation he worked for a while in the Baltimore and Ohio Railroad, the American Locomotive Company, and the T. C. Bassett Company in Baltimore, and did a lot of big work on the Baltimore sewage system. In 1915 he came to Boston as consulting engineer for Hornblower and Weeks, as expert on their various industrial problems, and did so well that in 1923 they sent him out to Cleveland as President of the Ohio Body Company to try to breathe a little life into that situation. This he did, but even Nat could not make it survive the slump, and it finally went by the board, taking with it, I am afraid, a good portion of Nat's health. Beginning October 1, 1927, he became a partner in Middleton, Eden and Company and after May, 1928, directed his own company, Middleton and Company, Inc.

"During the war he saw active service abroad and ended up as a major of the 23rd Engineers. In 1913 Nat married Miss Mina de Hart of Elizabeth, N. J., and the home they made was just about the most delightful place to visit that it has ever been my pleasure to go to. They never had any children of their own, but as an infant adopted the sweetest little girl who was Nat's passion. Mrs. Middleton and Mina, now nearly eight years old, are still living in Cleveland at 10112 Lake Shore Boulevard.

"Nat was one of those rare persons with whom it made no difference whether you had seen him 25 years before or only yesterday. You started just where you left off. He has gone, we miss him, but he did a good job while he was here, and we will remember him." — BRYANT NICHOLS, Secretary, 19 Rowe Street, Auburndale, Mass. HAROLD S. WONSON, Assistant Secretary, Commonwealth Shoe and Leather Company, Whitman, Mass.

## 1909

Hello everybody! I hope you have had a good summer and are so peped up that you will sit right down and tell me all about what you have been doing, and whether you have seen any of our Class during your travels. Any kind of news pertaining to the Class is always welcome to the Secretary.

We are indebted to Frederic H. Fay '93 for the following information about Ernest M. Loring: "For several years past he has been living with his family at Fisher, Province of Quebec, Canada, where he has developed and operates a gold mine and has established an extensive claim. Fisher is on the Canadian National transcontinental railway line in the northwestern portion of the Province of Quebec, not far from the Ontario boundary line, and many miles northeast of the widely known mining town of Cobalt. Fisher is a tiny mining community where, only a few years ago, stood virgin forest. Today it is a community of log cabins, and while in summer it is accessible by a motor road, in the winter it is isolated except for the railway. Mrs. Loring (Wellesley '09), her husband, and their six children, four sons and two daughters, find a cozy year-round home in this rather primitive but invigorating spot."

Mr. and Mrs. George Allison Haynes have announced the engagement of their daughter, Miss Marguerite Jane Haynes, to Harold Dean Collins, son of Mr. and Mrs. George Collins of "Thistleton," Frankfort, Ky. Miss Haynes attended the Baldwin School at Bryn Mawr, Pa., and Smith College. She is now a student at the Lowthrop School of Landscape Architecture in Groton, Mass. Mr. Collins has studied painting at the Academy of Fine Arts and the American Academy in Chicago, and at the School of the Museum of Fine Arts in Boston.

Dr. Charles Camsell, Deputy Minister of Mines and Industries of the Dominion of Canada, has this year been awarded the gold medal of the Institution of Mining and Metallurgy of England "in recognition of his untiring zeal and great ability in promoting the development of the natural resources of the Dominion and in furthering the general interests of the mineral industry." — CHARLES R. MAIN, Secretary, 201 Devonshire Street, Boston, Mass. PAUL M. WISWALL, Assistant Secretary, General Foods Corporation, 250 Park Avenue, New York, N. Y. MAURICE R. SCHARFF, Assistant Secretary, First National Bank Building, Pittsburgh, Pa.

## 1910

You certainly feel that the summer has gone rapidly as you sit down on the 24th of August to get out notes for the October Review. The appeals for letters from members of the Class have not gone out yet, so there isn't much copy for this number.

Carroll Benton writes: "You may be interested in the attached review of a recent book by Stuart Chase which I clipped from today's New York *Herald-Tribune*. It makes me want to go to Mexico. Just returned from my vacation as per usual on the shores of Lake Winnepeaukee. Came back to a hot city." — The reviewer says of Stuart Chase: "Chase is a poet-economist, with an artist's eye for color and an economist's nose for facts. He has a certified public accountant's passion for drawing up weird balance sheets of things he likes and dislikes about Mexico, of goods on

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sale in the market-place at Oaxaca, of Tepoztlán and its differences from Muncie, Ind. Doing so, he makes life in Mexico seem singularly exciting and colorful and peaceful."

I ran into Gorton James at the University Club the other day. He got tired of editorial work and accepted a position with The Thompson & Lichtner Co., Inc., in Boston as Vice-President in charge of marketing. — DUDLEY CLAPP, Secretary, 40 Water St., East Cambridge, Mass.

## 1911

With an attendance of 28 classmates, 21 wives, 11 children, and one guest, and favored with perfect late-June weather, our Twentieth Reunion at your Secretary's Douglas Inn, Douglas Hill, Maine, June 26 to 29, was a memorable success. Those attending were: Mr. and Mrs. R. M. Barton and Henry A. Barton, Mr. and Mrs. Ernest J. Batty, Mr. and Mrs. R. M. Bierer and Betty Bierer, Mr. and Mrs. O. S. Clark, Mr. and Mrs. M. E. Comstock and Barbara and Ruth Comstock, Lloyd C. Cooley, George B. Cummings, Mr. and Mrs. Lester D. Cushman, Mr. and Mrs. O. B. Denison and Orville, Jr., Helen-Elizabeth, and George Denison, Mr. and Mrs. Norman Duffett, Mr. and Mrs. Carl S. Ell, Mr. and Mrs. George H. Estes, R. H. Gould, Mr. and Mrs. C. H. Harrington, Mr. and Mrs. J. A. Herlihy, Mr. and Mrs. R. G. MacPherson and Molly MacPherson, Mr. and Mrs. R. E. Morse, Mr. and Mrs. C. L. Pepper, Carl G. Richmond, Mr. and Mrs. H. L. Robinson, Mr. and Mrs. N. S. Seeley and Frank and Tom Seeley, D. R. Stevens, Mr. and Mrs. O. W. Stewart, Mr. and Mrs. H. R. Tisdale, Mr. and Mrs. E. D. Van Tassel, Jr., Mr. and Mrs. Norman S. Wade, Walter B. Welch and daughter, Margery, E. J. Whitcomb, and our guest of honor, Dean Alfred E. Burton. Bob Mather registered in advance, but was unable to attend.

Under the highly effective direction of O. W. Stewart, the committee carried out its plans successfully and there was never a dull moment through the weekend. Dr. Burton had some delightful reminiscing throughout and told us the affair was one of the most enjoyable he had ever attended. On Friday evening we had the classmates report on their own activities through the years and had some fine movies of our Fifteenth Reunion, some Technology shots, a Douglas Inn reel, and some swordfishing movies Nat Seeley had brought along.

All through the days there was golf, tennis, shuffle-board, bathing, and fishing, and on Saturday afternoon we had a ball game with Herlihy's Giants winning from Van Tassel's Athletics by an alleged score of 23 to 12, with Dean Burton as umpire. Saturday evening we had a country dance, and between dances we had a series of stunts, first having divided those attending into three groups. Mrs. Herlihy's group gave the unique "Dance of the Bugs"; Mrs. Clark's, a tableau entitled "The Gathering of the Nuts," featuring Don Stevens as a sylph; and

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Mrs. Stewart's a series of animated charades. Your Secretary also entertained with songs at the piano; and young Henry Barton gave a pianologue.

On the Inn's nine-hole golf course, George Estes turned in the best card, a 93 for 18 holes, while Harry Tisdale, Chet Pepper, and Carl Richmond excelled in the archery and golf played on the course. Mrs. MacPherson was high lady and Royal Barton high classmate in a Saturday bridge party. The shuffleboard was busy throughout, but no championship was settled. On Sunday evening came the climax of the party — a wienie and marshmallow roast on top of Douglas Mountain, at an elevation of 1,407 feet, the Inn being at 1,000. With a glorious sunset and a near full moon rising, we had a delightful songfest. Veritably, a fine time was had by all!

Ray Cole, II, is now manufacturing distinctive souvenirs and novelties, winters in Wakefield, Mass., and summers in Monhegan, Maine. — Joe French, IV, is still in Moscow, Russia, in the interests of Albert Kahn, Inc., architects, in fact he plans to be there until 1932. He writes: "Letters are our only ties to God's country and if they reach us at all or only partly censored, we just worship them. So be sure to write or any of the boys, but don't get me in Dutch by questionable inquiries or remarks on Russia and especially no clippings." Meanwhile Joe's wife and daughters are at 209 Sip Avenue, Jersey City, N. J.

Fred Daniels, VI, was elected a member of the executive committee of the Worcester County Alumni Association of M. I. T. this summer. — Julian Gravely, V, formerly chief engineer of A. C. Gilbert Company, New Haven, Conn., is now in a similar capacity with Bond Manufacturing Corporation, Wilmington, Del. — From a recent issue of the Cleveland *Trade* we learn that Marc Grossman, III, formerly chief mechanical engineer of the Republic Steel Corporation, is now Vice-President of the Republic Research Corporation, Massillon, Ohio, subsidiary of Republic steel. Early in 1930 Harvard University presented him with a doctor's degree for his study of the quality and behavior of special steels. He has written many technical papers, made numerous addresses, and is co-author in presenting an English edition of Hey's "Physical Metallography."

H. Stokes Waite, II, wrote a fine letter early in the summer advising us that he is carrying on independently as consulting engineer at 17, Victoria Street, London, S. W. I., England. His work has often taken him far afield on the Continent and even to the Far East in the British Empire. He is a Fellow of the Royal Geographical Society and a member of the *Société des Ingénieurs Civiles de France*. In addition to much early work after leaving Technology in manufacturing development work, Waite has done a lot lately in hydro-electric development work. He writes: "I feel we are on the eve of a big change in the

fiscal policy of England and that soon we shall have tariffs imposed on the import of all manufactured goods which can be produced here. Then there will be good reason for many American companies to establish their own works here inside the tariff, just as Goodyear and Ford have already done." — ORVILLE B. DENISON, *Secretary*, 32 Reed Street, Lexington, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

## 1912

The summer brought us a few scraps of news, and a couple of pleasant meetings with classmates. J. I. Murray, VII, paid us a little visit and reported that he is still interested in the milk industry, but in a new connection. He has been with the Industrial Drier Corporation, Stamford, Conn., for the past few months as their research engineer. Murray has had a wide and interesting experience since graduation, having spent much time in various European countries in connection with the development and installation of dairy and milk product machinery. His present residence is Riverside, Conn.

Ernest Nicholson, I, gets in touch with us from time to time. He is doing a lot of traveling as field engineer for the Aetna Casualty and Surety Company and is pretty well acquainted with many big and interesting construction jobs, both existing and prospective. Nick has been very kind about sending us tips and notes of interest from the *Engineering News Record*, and we appreciate it.

From the Cleveland *Plain Dealer* we have a clipping carrying a photograph and story of former Commander Jerome C. Hunsaker, XIII-A, who is Vice-President of the Goodyear Zeppelin Corporation, Akron, Ohio, and in charge of the construction of the 6,500,000 cubic footship *Akron*, for the United States Navy.

We find that one of the best places to locate our classmates is around the corner of Fifth Avenue and 42nd Street. If we hang around there long enough we always catch some one of them passing by. Our most recent meeting (of this kind) was with E. C. Holbrook, I. He returned from Singapore about a year ago, and has since been in the New York office of the Truscon Steel Company as engineer for their foreign department. His present home address is 226 West 97th Street.

R. Bruce Brownlee, II, sends in an interesting contribution. "If you had asked me to write about the future of business," says he, "I could possibly have made a more interesting paragraph than when you ask me to write about myself. My position is director of research with Standard Statistics Company, Inc., of New York and I have been with the company for nearly 12 years. The research department handles all technical statistical material and acts in an advisory capacity on the subject of statistics for the rest of the organization. The department designs and executes all index numbers on financial and industrial subjects — there are many more than a hundred — makes special analyses in subjects re-

quiring a more technical handling as opposed to the editorial material prepared in other departments, compiles financial, industrial, and business statistics, prepares all charts for publication, and so on. So much for the job.

"What is my hobby? It is neither golf nor the movies. The evenings give me time for statistical study on subjects or along special lines that are not in process in the office. This is generally topped off with a detective story if one is available, sufficient proof of executive ability. At least it seems to me that all good executives are supposed to stand or fall on their quiet consumption of this form of excitement. The week-ends are devoted to motoring, always accompanied by the same wife I had at Technology; our health in general is excellent, thank you." Brownlee concludes his letter saying he'll be glad to have any of the boys drop in to see him when in the vicinity of his office at 345 Hudson Street, New York City. His home is in Scarsdale, N. Y.

When the Erie Railroad picked up its New York offices and moved them wholesale to Cleveland, A. C. Albee, I, was transplanted, too. He has been in the Erie's engineering department for several years. His new headquarters are Midland Bank Building and his home address is 13403 Cedar Road, Cleveland Heights, Ohio. Albee writes as follows: "I had two weeks vacation and took a trip to Boston. Visited Doc Sloan and went over his new apartment building; also saw his welding shop which is located near his home. Doc is starting in a good line of work in my opinion, as I believe that in the near future practically all riveting in both field and shop work will be eliminated and replaced by welding. The Erie has several welding gangs and you can readily see that in case of repairing a truss bridge by welding, the necessity of planning and removing false work is eliminated. False work costs from \$2,000 to \$15,000 per bridge."

The following bit of news was sent in by Professor C. E. Locke: Harold R. L. Fox reports that since 1926 he has been chief engineer of the Government Railway on the Island of Jamaica, and at the present time is acting manager. The railroad is of the mountain type, and is one of the oldest on the American continent, having been built in 1846. It is of standard gauge and constructed on extremely heavy grades and sharp curves. The grades are one in 30 combined with 18 degree curves. The grades are uncompensated for curvature. It has a large number of bridges and tunnels. For instance, there are 20 tunnels in a distance of 10 miles. When he took on the job of chief engineer the railroad was pretty well down and out. Although the total length is only 245 miles, there is more work to be done and more responsibilities than the average chief engineer would have on a railroad of 1,000 miles or so. He has practically rebuilt every bridge on the system, and over 75% of the track.

Although his training at Technology was along mining lines, he has been very successful as a railroad engineer in re-

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habilitating the road. His last trip to the United States was in July, 1919, after his service in the War. When he gets leave now he usually goes across the Atlantic to Great Britain and Europe, but he hopes sometime to come back to a Technology Reunion. He has done very well in raising a family on the side, having now two boys and two girls, the eldest being 14 years of age.

He reports that there is only one other Technology man working in Jamaica — George W. MacDuff '26, who is with the Stone and Webster Corporation, which manages the Jamaica Public Service Company, a power, light, and tramway concern. Fox especially requests that if any Technology men should be going to Jamaica during the winter on their vacation that they get in touch with him. There are two tourist hotels in Jamaica, the Myrtle Bank and the Constant Spring, and people at each of these hotels can put the tourist in touch with Fox very readily. — FREDERICK J. SHEPARD, Jr., Secretary, 125 Walnut Street, Watertown, Mass. DAVID J. MCGRATH, Assistant Secretary, McGraw-Hill Publishing Company, Inc., 10th Avenue and 36th Street, New York, N. Y.

## 1914

The event premier of the summer took place in Washington, D. C., when on July 27, with Mrs. Amelia Earhart Putnam as matron of honor and Senator Hiram Bingham as best man, Miss Sue Shorter became the third Mrs. Porter Adams. From an acquaintance with Miss Shorter we feel that Porter is indeed to be congratulated, and may well hum that familiar melody "Happy Days are Here Again." It is not new to learn of new honors being conferred on Porter, but it is always pleasant to record them. In June he was elected a Trustee of Norwich University, Northfield, Vt. He is also Trustee of Thetford Academy, Thetford, Vt.

One of the real cures for sore eyes that came to Boston this summer was C. W. Ricker. In spite of the fact that he is professor in charge of Electrical Engineering at Tulane University, at New Orleans, Rick has a way of being most human when off duty. Although much too short, his stay with your Secretary furnished a splendid occasion to celebrate Institute days.

Another '14 man making a brief visit to Boston during the summer was Captain L. W. Burnham of the Marine Corps. Burnham was on the S.S. *Arizona* when she made a short call at the Boston Navy Yard. Lieutenant Joe Currier, U.S.N., was on duty at the Navy Yard when Burnham came in and appropriate welcome was arranged.

Chet Corney, who occupies a high position with the Boston Edison Company, has been elected Chairman of the Boston section of the American Institute of Electrical Engineers. — Fourteen men still keep the Patent Office busy. The recent issues of the *Gazette* contained announcements of the following patents: to J. W. Horton, No. 1,808,923, covering a

synchronizing system, which when translated means a system for television use, and No. 1,816,905, covering a communication system; to E. C. Wente, No. 1,812,389, for an Acoustic Device representing a further contribution of Wente to the loudspeaker art; to H. A. Affel, No. 1,811,905 for a Means of Control of Cross Talk. This patent does not deal with marital relationships, but only with telephony.

The wholesale retrenchment that took place in the Boston office of Stone and Webster caught Frank Ahern in its wake. Frank has developed quite a reputation on insurance and fire protection matters and would make a valuable addition to any organization in need of such a man.

From E. C. Wente comes the belated announcement of the arrival on October 7 of last year of a son, Edward Frank. Bearing the familiar handwriting of Ross H. Dickson came a post card with the picture of a handsome young girl and this bit of poetry: "Nancy Jean Dickson announces with joy, The arrival of a sister, who should have been a boy. Enid Nellis is her name, And June tenth the day she came." Not to be outdone by his brother chemist, Don Crowell announces the arrival just two months later of his second daughter, Barbara.

One of the pleasures of summering on Cape Cod is the renewing of the friendship of Institute days with Donald Dixon, of Monument Beach. While officially engaged in operating an automobile establishment, Donald finds time for several outside activities, including being chairman of the Finance Committee of the town of Bourne. With a tenacity for antiquity characteristic of Cape Codders and fishermen from Marblehead, Dixon continues to publish the high tide timetable for bathers in Eastern Standard Time. By another generation the Massachusetts legal Daylight Saving Time should have penetrated the languid atmosphere of the Cape, but perhaps in doing so will break down that quaint charm for which that region is so rightfully famous.

While browsing along the wharves of Provincetown on a warm summer's day, your Secretary chanced upon E. C. Crocker who was equally busily engaged. Crocker, too, is an ardent enthusiast for Cape Cod as a vacation land. He has had a rather busy summer as he has just purchased a splendid new house in Belmont, with all the resultant moving that such a change entails.

In Donald Dixon's township of Bourne there has appeared a sign on the drive leading to one of the typically quaint houses with windmill attached. The legend the sign bears is "V. M. F. Tallman." Vernon, too, has joined the Cape Cod colonists. — HAROLD B. RICHMOND, Secretary, 30 Swan Road, Winchester, Mass. GEORGE K. PERLEY, Assistant Secretary, 21 Vista Way, Port Washington, N.Y.

## 1915

In the sad and sorrowful passing of Mitchell B. Kaufman, X, our Class has been dealt a hard blow. Mitch, an out-of-

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doors advocate, usually went hunting every fall with a group of fellows and while on such a party near Jackman, Maine, on November 5, 1930, became separated from his guide and party and was lost in the woods. A thorough and extensive search was made for him by his family, friends, and business associates, but it was not until May 18, 1931, that his body was found about nine miles from the camp. It is presumed that Mitch died from exposure and exhaustion. His body was hurriedly returned to Boston where a quiet service was held. Seven men from our Class — Abe Hamburg, XI, Weare Howlett, X, Larry Landers, X, George Rooney, I, Frank Scully, I, Jac Sindler, X, and Max Woythaler, V — attended the funeral. I regretted being out west at the time.

Words fail me to describe properly the feelings of the entire Class for Mitch, for his likeable personality, his ready wit, his leadership, and his class loyalty and spirit. As an undergraduate, while struggling with the rest of us for the coveted degree, he was quiet and unassuming. After graduation he worked as manager of the Archer Strauss Rubber Company at Framingham, Mass. He developed this into a very successful company and in 1928 he bought the Converse Rubber Company of Malden, Mass., of which company he became President. He associated with himself a number of our classmates and some other Technology men. At the time of his passing Mitch was on the threshold of a brilliant and successful future and was looked up to as a prominent figure in the rubber industry. In business he was a strong individualist and an inspirational leader who held his associates close to him in following his policies and ideals. Many lives were benefited by the extensive scope of his contacts and influence. He was a natural leader with an unusual power for grasping and analyzing facts with keen foresight and sound judgment. He gave generously to many organizations and activities.

Mitch was actively interested in all class affairs and we could always count on his generous and loyal support at any class doings. All those who remember him at our Tenth and Fifteenth Reunions and the intervening class dinners will recall his beaming nature. His work on the golf committee at Marblehead last year helped make that party such an enjoyable success.

The Class has had prepared and presented to Mitch's family a memorial engrossed in a beautiful and illuminated design on heavy vellum, bound in soft leather fold with an appropriate cardinal and gray ribbon with the following sentiment: "The passing of our classmate Mitchell Kaufman on November fifth, nineteen hundred and thirty, from his cheerful and useful activities, brings to the members of the Class of 1915, Massachusetts Institute of Technology, the deepest and sincerest sorrow. We take pride in recalling his enthusiastic and loyal devotion and service to our Class.

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"We tender to Mitchell's family our sincere sympathy for them in their loss and grief and express the hope that they will find comfort, as we do, in the recollection of his honorable career."

It is only fitting that we omit all other class news this month and leave this issue as a memorial in these records to Mitch's memory. — AZEL W. MACK, *Secretary*, 379 Marlboro Street, Boston, Mass.

## 1917

Nig Sewall, named Edward Dennis Sewall by his parents, he of the French-Canadian dialect stories and other brilliant accomplishments, is now a sober, sedate, married engineer, working for the Oneida Community, Ltd., makers of the well-known Community Plate, and his address is Kenwood, Oneida, N. Y. As you know, Nig was previously with MacDonald Bros., Inc., and was employed in consulting engineering work. He has now been honeymooning for a considerable period, and has a five-year old boy. He writes: "Just at present I am at this plant for a couple of weeks and expect to be six weeks at their two Canadian plants at Toronto and Niagara Falls and then back to Kenwood to settle down for life in my own home."

"I've had one glorious honeymoon. Spent about five weeks on Buzzards Bay and two weeks driving through the province of Quebec with the Frenchmen. Got over 200 miles north of Quebec City in the middle of the forest. I highly recommend the trip from Quebec up the St. Lawrence, north to Chicoutimi and Lac St. Jean, and then south to Quebec through the National Park of 4,000 square miles, 1,200 lakes, and 400 rivers. It is a new road this year and the most interesting auto trip I've ever had."

Another traveler is the Dean of the Institute, H. E. Lobdell. Early in August he had covered some 6,000 miles, taking in the Grand Canyon, Yosemite, Lassen Park, and the Redwoods. He is planning to be back in time to open up his Cambridge school.

Roger B. Brown was found this summer hiding in the laboratory of Mr. Sutherland, paper manufacturer of Trenton, N. J. Brown had previously been with the Brown Company at Berlin, N. H. He is now working on new processes for treating paper fiber. — J. Justin Basch is understood to have his headquarters in New York City, representing the Oakite Company. — On Sunday, June 28, Miss Margaret Brady, a school teacher of Burlington, Mass., became the bride of E. S. Lyons. — Capt. F. S. Conaty, writing from Phoenix, Ariz., sends the following clipping concerning Leslie R. Groves, who was with the class for a year or two.

"First Lt. Leslie R. Groves, Jr., CE, U. S. A., has received a citation from the Nicaraguan Government for his work at Managua. Lieutenant Groves was created a Chevalier of the Order of Nicaragua and awarded a gold medal to commemorate his services in restoring the water works at Managua after the March earthquake."

It is respectfully suggested that you make your plans now for the Fifteenth Reunion that will be held at the Corinthian Yacht Club, Marblehead Neck, next June, if present plans are carried through. That is, unless some opposition party presents a sufficient argument for a better location. Those who were privileged to be present at the Corinthian on the Tenth Reunion are not expected to enthuse about any change. Suggestions, however, will be welcomed. — RAYMOND S. STEVENS, *Secretary*, 30 Charles River Road, Cambridge, Mass.

## 1918

Ye Class Secretary expresses official regrets for having missed the July notes (his first offense) and offers by way of explanation, five weeks of horizontal existence with what was diagnosed as typhoid fever. But there was a typical symptom known to the profession as "rose spots," which never appeared. Did I say never? Of course there was the morning after the night when the merucrochrome bottle disappeared. The astonished doctor on his early rounds uncovered the sweetest circle of rose spots arranged in an exact Euclidian circle! Illness need not be unrelieved monotony.

The fall trek has set in and among the list of changed addresses we note the return of John Alston Clark from Europe, where he has been for some years. Those desiring to test their German gutturals should arrange to try them over on John at the College of Liberal Arts and Sciences, Temple University, Philadelphia. Most of us have declared a moratorium on *Adolf ein Lichtenstein*.

John T. Norton, who has spent some good years peering through steel castings with the aid of an x-ray machine, and who has consistently been good natured when asked to entertain any guests we might be showing about the Institute by such pleasing tricks as revealing small change, keys, or compacts in an unopened hand bag — John has received a fellowship from the American Scandinavian Foundation, which will take him from his associate professorship at Technology for some European study.

Richard Smith of the Aeronautical Department, who now rates the title of professor without any qualifying adjective, has been in Germany since May, for the most part working at the Aerodynamic Laboratory in Goettigen. We shall know more when he gets back for the opening of college, but he will have to tell it to us in good United States.

Sax Fletcher laid down a big blue print that looked like a humidity chart one hot day in New York last summer, long enough to declare with some enthusiasm that he has a third child and second son to be known, if you must have it all, as William Morton Fletcher. But there were those who felt that Sax should not be allowed a paragraph all to himself. — John Woodward welcomed daughter Mary on March 25. — Ed Rogal cut some more coupons and reflected on the high cost of brand new babies about June 1, when he also foresaw the necessity of

some day selecting a young ladies' finishing school. — Don MacArdle walked nervously back and forth, thinking those things which all expectant fathers are supposed to and do think, till daughter Carolyn finally relieved his anxiety on July 7.

With this distinctly feminine trend, the brethren will be prepared to hear that our Gretchen has decided Boston winters are too severe. Consequently, The Thomas School on The Wilson Road at Rowayton, Conn., is to have a vibrant new Executive and Financial Secretary. The prospectus at hand speaks of 25 boarding pupils and a full school of about 150 boys and girls, spanning that fascinating gap of ages from two, when they begin to be really human, till 18, when they become definitely impossible. The geography at hand shows Rowayton to be on Long Island Sound between South Norwalk and Darien. The anthology of verse at hand quotes a sonnet John Keats wrote "On First Looking Into Chapman's Homer." We wonder whether the last line will ever apply to Gretchen? — F. ALEXANDER MAGOUN, *Secretary*, Room 5-328, M. I. T., Cambridge, Mass. GRETCHEN A. PALMER, *Assistant Secretary*, The Thomas School, The Wilson Road, Rowayton, Conn.

## 1920

Our small but select off-year reunion came off as per schedule at the Cliff House, Scituate, and a day of golf and good fellowship was enjoyed by Bud Cofren, Ken Akers, Ted Hobson, Bob Pender, Bill Somerby, Perk Bugbee, and your humble Secretary. If I have left anyone out, I apologize. Last June seems a long way off and curiously enough my memory is a bit hazy in regard to that particular day. Anyhow we had a slick time and I only wish a good many more of you had been there with us.

As these notes come due, I receive most unwelcome news from the mother of Florence Buckland (formerly Fogler) telling me of the tragic drowning of her two little boys, one five and the other three and a half, leaving but one two-year-old of her family of three boys. I know that this news will be a great shock to Florence's many friends and classmates and that the sympathy of the entire class will be extended to her in this great bereavement. Florence may be addressed, Mrs. Bruce O. Buckland, 1711 Randolph Road, Schenectady, N. Y.

A society wedding which attracted a great deal of attention was that of Miss Elinor Francis du Pont, daughter of Mr. and Mrs. Irénée du Pont, to Phillip Goodnow Rust at Wilmington, Del., on May 9. Rust is with the Discose Company at Marcus Hook, Pa. — Stan Bragdon is now located at 2927 South Superior Street, Milwaukee. We would like to know what he is doing, but we don't. — Herb Dorr is now located in Leominster. We understand that he has been looking around Boston for some time, but he never gave us a tumble.

Ned Murdough has been promoted to District Manager of the Portland territory of City Service Company, and has

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his residence in Falmouth Foreside, just outside of Portland on the Brunswick Road and overlooking the bay. I spent a very pleasant evening with him last week and can highly recommend it as a delightful port of call to any classmates in the Portland district. — At the risk of becoming not only monotonous but exceedingly tiresome, I might mention that if these notes are received in the same bitter silence as past efforts, there won't be any notes next time. — HAROLD BUGBEE, *Secretary*, 7 Dartmouth Street, Winchester, Mass.

## 1921

Chairman Dan Harvey of our Tenth Reunion Committee deserves a big hand for planning and staging the gala tenth birthday party of the Class at the Sheldon House, Pine Orchard, Conn., June 19 to 22. Golf, tennis, and swimming were the order of the day and everybody took advantage of the excellent facilities available. Entertainment at meals was furnished largely by Amos and Andy's only rivals, the "Aquarium Twins," Larry Davis and Buz Burroughs! Larry Conant's impromptu glee club was a howling success. Added attractions were the colloquia on timely subjects. Of these the most lengthy was one on "Why is a Reunion?" presided over by Lew Hurley; and the most comprehensive, the joint recital by Chris Nelson, Archie Mock, Munny Hawes and Larry Castonguay on "Where Did Morgan Put the Cigars?" The Boston and New York districts had the largest delegations to the reunion, honors for having traveled the farthest going to Archie Mock of San Francisco. Harry Field had journeyed from Honolulu, but to our regret he was forced to cut his trip short and was not able to attend.

Those present were: Tony Anable, Fred Binns, Frank Blewer, Buz Burroughs, Larry Castonguay, Cac Clarke, Larry Conant, Josh Crosby, Harley Dann, Larry Davis, James Dawson, Bob Frost, W. M. Gill, Bill Hadtham, Dan Harvey, Don Hatheway, Roy Hersum, Munny Hawes, Johnny Hull, Lew Hurley, Irv Jakobson, Andy Jensen, Al Kiley, Chick Kurth, Moose LeFevre, Dick McKay, Archie Mock, Chief Myers, Chris Nelson, Warrie Norton, Jim Parsons, Norm Patton, Al Povah, Eddie Rogal, Ray St. Laurent, Shag Shaughnessy, Lyall Stuart, Sol Silverstein, Don Swift, Jim Wilson, and Dick Windisch.

Irv Jakobson celebrated his bachelor dinner at the Reunion and returned to New York to join the benedicts on June 23. His latest entry in the Class Book reads: "Going to get hooked Tuesday the 23d, — two days off. About time, but it took a long time to get the nerve for the stunt." About himself Irv says, "With firm of Jakobson & Peterson, Inc., Brooklyn, N. Y., ever since graduation. We build and repair everything from garbage scows and tugs to yachts, in fact, anything that floats. We like them best when they don't want to float."

Sumner Hayward, of the New York Telephone Company way over yonder in Brooklyn, reports the marriage of San-

ford Hill and Miss Velma Vetter on May 30, 1931. San is with the du Pont people in Wilmington, Del., and he and the Mrs. are making their home at 1307 Broom Street, Wilmington.

From the Portland (Ore.) *Journal* of May 10, 1931: "Irving G. Smith has been added to the staff of Morris H. Whitehouse and Associates, Portland architects, during the period of plan and preparation for the \$1,200,000 Federal office building. Smith, a classmate of A. Glenn Stanton and Walter E. Church, also members of the firm, has been with A. E. Doyle and Associates for some time. Following graduation, he practiced architecture in California before coming to Portland."

Harold A. Zager, professor of mathematics at Newton College, broke into the news as collaborator with George H. Hurd, Boston cotton-waste salesman, on five different methods of trisecting an angle by Euclidean geometry. Messrs. Zager and Hurd, according to the New York *Herald Tribune* of August 16, 1931, claim to be able to reduplicate the cube and to square the circle, provided Pi is proved to be a positive value.

It is with regret that we read of the drowning of Chelso Arrigoni, of Middletown, Conn., May 31, 1931. He was crossing Lake Winnipesaukee in a motor launch after a visit to the camp of Jack Delaney, the light heavyweight boxer. Chelso, who was a member of the Elks and the American Legion, was vice-president and general manager of the Middlesex Theater Corporation. He was State Senator in 1929 and also served as chairman of the commission which reported to the last General Assembly in Connecticut on a new bridge over the Connecticut River at Middletown.

Professor C. E. Locke, the patron saint of class secretaries, sends us the following: "Richard W. Smith is the author of an article on 'Geology and Origin of the Phosphate Deposits of Tennessee,' appearing in the *Engineering and Mining Journal* for July 27, 1931, which presents some interesting and new data based on microscopic evidence concerning the origin of these phosphates."

U. S. Patent No. 1,807,386, assigned to the Victor Talking Machine Company, has been issued to C. A. Clarke for the adaptation of metal plate antennae to cabinets housing radio receiving equipment. — RAYMOND A. ST. LAURENT, *Secretary*, Rogers Paper Manufacturing Co., South Manchester, Conn. CAROLE A. CLARKE, *Assistant Secretary*, Bell Telephone Laboratories, Inc., 463 West Street, New York, N. Y.

## 1923

A lot of vital statistics have accumulated over the summer months. A clipping received tells of the engagement of Edward J. Healy, IX-B, to Eleanor Belz of Salem with the wedding scheduled for the fall. — Harold Cotter, X, was married on July 14 to Helen Marie Maher in Bangor, Maine. — Harry Pearson, X, who runs a plant for the Dewey and Almy Chemical Corporation at Farnham,

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Quebec, is the proud papa of a son, John Bruce, born on July 28. Farnham is only 40 miles from Montreal and Harry invites any of you that may be motoring that way to drop in and see him. — Pete Pennypacker had a card recently from George Bricker, VI, announcing the birth of a daughter. — Lem Tremaine reported some time ago that Bill Tayler, II, had written from Europe announcing the birth of a son.

Late in May, I was very sorry to receive the news, through Eddie Schatz, I, of the death of Charlie Wenz, I. Charlie had been city engineer of Rensselaer, N. Y., and a member of the Albany Port Commission up to two years ago, when he began a losing fight against illness to which he succumbed on May 22 at Saranac Lake. Eddie himself is still working on the Albany water supply.

Information has also been received of the death of Alfred H. Crossman, I, on February 8. He had been sales engineer for the Pacific Electric Manufacturing Company in San Francisco.

Coming across the continent in July, I was startled on picking up a Denver paper to read of the airplane crash in which Francis T. Hazeltine, VI-A, was killed. He was flying his employer, the manager of the Trinidad Bean Company of Trinidad, Colo., when the accident occurred. Hazy was one of the group of 20 or more of us who took the Air Service R. O. T. C. course, and the second one of the group I know of to be killed in a flying accident (Buck Sack, VI, was the other). He stayed in aviation following graduation, completing the army flying course at San Antonio, Texas. He later went with the Curtiss-Wright Flying Service in Denver doing photographic work. A year ago he became a pilot for the Goodmont Motor Company of Worland, Wyo. Soon after he joined the Trinidad Bean Company which had bought the plane in which he crashed for publicity purposes, as a part of a national advertising campaign. In 1924 he married Helen Snow of Denver who survives him together with three children, Sally, age 6; Francis, Jr., age 4; and Thomas, age 2.

Some of you may have noticed the frontispiece of the Anniversary edition of the Chicago *Herald and Examiner* in May depicting the Tower of Water and Light which is to be the central figure at the Chicago World's Fair in 1933. The artist was Louis Skidmore, IV, who is chief of design for the Chicago World's Fair Commission.

Another artist of growing reputation is Lester Bridaham, X-A, who has definitely deserted engineering for art. As was noted in the July Review, he has been awarded the American Field Service Fellowship of the Institute of International Education. In reporting his departure for the French University of Paris, where he will study architectural research and painting, the Denver Post says: "For several years he followed his profession as a chemical engineer and was employed by large steel companies in Pennsylvania and New Jersey. He developed a great interest in art and while

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living in New Jersey he joined the Student Art Club in New York and attended night classes in painting conducted by Nicolaide. He displayed considerable talent and was encouraged by his teacher to study abroad. He spent his vacations in the art colonies of France and Morocco and painted many scenes of Paris and Fez. These, along with life studies of Harlem negroes, he exhibited in New York and also in Denver last fall when he visited his mother. While in Paris he made a study of French architecture in the great cathedrals and recently published a book 'Gargoyles, Chimeras, and the Grotesque on Gothic Sculpture of the Cathedrals of France' which met with great success. His year in the French University, he writes, will be spent in research work that will form the foundation for two other books he plans to write."

J. Westgarth Voelcker, VI, found his transfer to the Phoenix Works of the English Electric Company at Bradford, England, a favorable one, as shortly thereafter he became assistant for traction motor design to the chief D. C. designer.

E. S. Birkenwald, I, has what sounds like a very interesting job. He writes: "As you probably know, I have been with the Southern Railway for the last six and a half years, starting my service with them as bridge inspector and working up to senior assistant engineer in the bridge department of the office of chief engineer M. W. & S. Lines East. My duties are varied and interesting. I pass on all movements of all large shipments over our lines east, approximately 5,100 miles of line. Besides this I check and make designs of steel, reinforced concrete, and timber structures and prepare or check details for the same. Besides this, I travel over lines east which extend from Washington to Charleston, Savannah to Atlanta, and from West Point and Norfolk, Va., to Memphis, making bridge inspections, studying grade crossing elimination projects to make reports on them, and also to aid bridge foremen who have charge of the construction of bridges."

I have the following letter from Kitty Kattwinkel, XV: "Various mileposts have been passed in my career as a physician during the past year. In June, 1930, I received my M.D. from Harvard. From July 1, 1930, to July 1, 1931, I took my internship at the Newton Hospital and a very busy year it was. About two weeks ago I received word that I had gained my certificate with the National Board of Medical Examiners and yesterday (July 21) after a week's vacation, my wife and I hung out the hard-earned 'shingle' at 22 Maple Street, Auburndale. Office hours are from 1:30 to 3:30 p.m. — evenings by appointment. I am one of the so-called disappearing tribe of general practitioners. I was fortunate enough to be offered a place on the Newton Hospital staff the day I finished my internship and naturally accepted. Ray Holden, XV, dropped in last week while visiting his family. He is back in St. Louis with the

Weil Kalter Company, manufacturers of rayon, as production manager, and likes his job very much."

Charles Keevil, X-A, is head of the department of chemical engineering at Oregon State Agricultural College in Corvallis, Ore. After graduation he spent three years in industry and then returned to the Institute for a year in the Course X practice school. He served for three years as an instructor in the chemical engineering department and during this time completed the requirements for the degree of Doctor of Science which he received in June, 1930.

Paul Ryan, VI, has been with Shell Petroleum since 1928 and since 1929, manager of the technical products department. In April this year he was made manager of advertising and sales promotion. All I can get out of George Southard, XV, for publication is that he is working with the Patent Office in Washington. He is another one of these fellows who took graduate work, in his case graduating from the Harvard Law School.

A visit to San Francisco this summer gave me a chance to say hello to Frosty Harmon, X-A, and an opportunity of meeting Mrs. Harmon. He is with a United States Steel subsidiary in San Francisco and has recently become secretary of the Technology group in that city. — Pete Pennypacker says that this summer he met Allen Isaacson, VIII, on the street in New York. Isaacson told of a three-year honeymoon in the wilds of Africa. He has recently affiliated with the Federal Shipbuilding Company in Kearny, N. J., doing estimate work in connection with four new Panama Mail, Grace Line vessels which that company is building. He and his wife made their headquarters in Jersey City. — HORATIO L. BOND, Secretary, 31 Concord Avenue, Cambridge, Mass. JAMES A. PENNYPACKER, Assistant Secretary, Room 661, 11 Broadway, New York, N. Y.

## 1926

In preparing an historical note on the Reunion it might be advantageous to use the style of the newspaper society editor and describe what the guests wore. Let me demonstrate.

B. P. Richardson was charmingly attired in a delicate, shell-pink chiffon gown with waterfall flounces, accentuated in the rear by a slight bustle in the prevailing mode. The beauty of the gown was deftly set off by a blue horsehair hat molded to the head and garnished with an ostrich plume, revealing on one side the lovely Viennese coiffure for which Mr. Richardson is famous. The lace gloves and rainbow-hued sandals completed the ensemble.

The only difficulty with this historical method is that this is not what Mr. Richardson wore. In fact, he wore scarcely anything during a portion of the party. His variation on the modern bathing suit will be long remembered as one of the most striking creations seen at the Reunion. Mr. Kenneth Lord was also a center of interest presenting as he did one of the earliest showings of a now preva-

lent Victorian style. His bathing suit was extremely full and was striking for its "loose" skirt. Mr. Lord made the most of his costume, emphasizing the more significant parts of the body by upholstering devices.

Would that it were possible to continue this very personal description of the Reunion, but since more than 60 men were present it is obviously impractical. Anyway, the prevailing costume, furnished by the Reunion Committee, consisted of a rather limp high hat, a beautifully tailored pair of overalls, and a cane of more strength than beauty. Since all of the overalls furnished were the same size you can well imagine the effect produced when they appeared upon such diverse figures as Jerry Doolittle, height 5 ft. 4 in. (or thereabouts) and Dave Shepard, height 6 ft. 7 in. ( $\pm$ ). Flint Taylor, who falls somewhere between these two limits, was particularly dignified and formal in this costume, especially after he had emerged from a graceful swan dive into the pool fully dressed. He came up, remarkably enough, with his hat on and cane in hand. The overalls, however, were somewhat displaced.

Dave Shepard, every inch a president, was, of course, the dominating figure at all the Reunion events. His majestic, Empire-State physique, however, failed to save the married men's baseball team from receiving a thorough drubbing at the hands of the single men.

E. N. Roberts — euphemistically known as Bull — was the greatly acclaimed winner of the long distance prize, having journeyed from South America to the Reunion. Bob Dean, endowed as he is with a lovely falsetto voice, presided at the Singfestspiel held on the shore around a big campfire Saturday night. Ted Mangelsdorf, the prime ramrod, was, of course, much in evidence while our star soda jerkers, Goldberg and Constantine, were plying their profession intermittently.

Sam Cole was the lord high umpire of all athletic events, a job he administered with much dispatch while dodging pop bottles. Joe Levis was instigator of the athletic contest and did a swell job. Everyone else did a swell job, too, and it is deplorable that each and every one cannot be given an individual hand. Perhaps as the year progresses we shall throw in an historical note here and there until we get the entire Reunion covered. We will merely mention in closing the exhibition of golf prowess displayed by Ralph Head, George Edmonds and others, and the melodious noise which Dave Shepard made when he sat down at the head table.

Now for a few vital statistics about members of the Class, mostly of the un-washed division who were not present at the Reunion. Bean Lambert is in Europe on his honeymoon. He and Fred Walch sent a somewhat illegible card to the Reunion, written at *Le Numéro de votre Canard*, Paris. — Edward Rawnsley Huckman and Eleanor Prescott Huckman of St. Louis have announced the birth of Robert Prescott Huckman on August 19.

1926 Continued

— Mrs. Mary B. Y. Whittemore has announced the marriage of her daughter, Margaret, to Wilfred Fairbanks Mathewson on May 29.

During the latter part of August a number of the members of the Class gathered at the Parker House in Boston to bid a fond farewell to Pop Constantine just before he embarked on a matrimonial career. — Mac Macdonald reports that he attended the Humphreville nuptials at Reigelsville, N. J. He encounters Charlie Bianchi occasionally at the movies.

The Secretary called upon George Leness recently at his desk in the Chase Harris Forbes Company office. — Mooney Owen was married on the evening of September 26 at the First Methodist Church in Peoria, Ill. After he returns from his honeymoon he may be reached at 940 Pleasant Street, Oak Park, Ill. — Julius Goldberg, if not already married, will be shortly. — Francis G. Fine, Jr., was in the office in August. He is in the insurance business in Philadelphia. Wilbur Criswell, Jr., likewise called. He is in the coal business in Philadelphia. — Dick (Henry W.) Jones has accepted the Francis W. Fabyan Fellowship for graduate work in Course XV. These fellowships, six in all, are designed to qualify technically trained men for early advancement to high administrative positions. Locally the six holders are known as "Schell's guinea pigs." — J. RHYNE KILLIAN, JR., *General Secretary*, Room 11-203, M. I. T., Cambridge, Mass.

#### COURSE V

This will have to be an alphabetical inventory to see who is where, how and why after this two-year lapse. Members are asked to supply missing items.

George Bates is, by hearsay, teaching in Newburyport High School, Mercersburg, having no use for married men. You'd think it was Yale. — Ernie Baxter at latest report was still in the employ of Eastman Kodak Company and living at 56 Maplewood Terrace, Rochester. — Borney Billings has come East in the past year or so and works somewhere in Rhode Island, whence he commutes for week-ends in Boston. We suspect he can be reached at 12 South Street, Brighton.

Chippy Chase passed through this town on vacation in a gallant Peerless sedan with Mrs. Chase and Barclay. They were intending to take an extensive trip as far south as Washington, then north to Moose Lake, Maine. — Following the virtual cessation of research activities by the United Fruit Company, Stan Cheney found himself an interesting situation with Plymouth Cordage. Stan had the rôle of best man at the Humphreville wedding in June. This was his seventh performance, and we can attest to his remarkable proficiency. It matters not what the ritual — one would dare be married in Afghanistan with Cheney as best man.

Other than dissertations on moving boundaries in the journals, no word has been heard from Cowperthwaite, so

we'll assume he's still at the Rockefeller Institute in New York. Whether or not the Ph.D. from Columbia has been achieved is a pertinent question. — Johnny Fletcher, while placing his trust in Uncle Sam to the extent of keeping his address in a post office box, forgets that most honest people give the mail man a forwarding address when they move, so the bone he picks with *der Chemikersekretär* on the ground that he disappeared *surlors* is groundless. The contention that a more active secretary is due Course V has merit, but we must all live our own lives and not a dozen other fellows' vicariously. We are still waiting for some news of moment from Willimantic.

Wally Sanderson at last accounts was still connected with Metcalf and Eddy, with that lyrically beautiful laboratory in the Statler Building, Boston. — Johnny Searles, likewise has remained with his first love — Plymouth Cordage — where he has been joined recently by Cheney, the unique case of two of us working for the same concern. — Yet another — Van, the man from Maine; but I suppose he spells it Montana now; with only one employer since leaving school. The last address appears to be 1515 Third Avenue, North, Great Falls, Mont.

Reggie Wakeman — what a story he could tell — and will tell us, let's hope, when he returns from these peregrinations which seem to be leading toward Russia. With the Ph.D. tucked in his belt, Reg spent a year in France and is this year studying in Germany. — Charley Wurtzel and Val Harrington have not been heard from in these five long-short years. The same goes for Steve Kamedzawa.

This completes the roster. Are there any additions or corrections? — IRVING R. MACDONALD, *Secretary*, 381 Passaic Avenue, Nutley, N. J.

#### COURSE VI-A

The summer months are nearly gone and most of us have had our vacations and feel better (or worse) for them. We spend 50 weeks at our various labors and then in two weeks endeavor to balance the scale by doing as much in the vacation as we did the rest of the year. It is a change at any rate and they say a change is as good as a rest. So saying, we rested for two weeks.

Everybody seems to have attended pretty much to his own affairs and has been too busy trying to keep cool to indulge in correspondence (myself included) during the last few months, and so I have very little news for you. Phil Richardson is now in double harness, having hitched himself up recently. He is a budding doctor, having given up using pi for using knives, and so forth, to find out where it went to and why. Well, an M.D. has it easier in covering up his mistakes than an engineer unless the bridge is small and the river deep.

Say, you boys sure missed out on one grand week-end when you passed up the Reunion. Marty Davidson and I upheld the honors of the VI-A group and he had

to do most of it himself as I was too busy having one grand time, if you know what I mean. Marty entered most of the contests, including golf, and obtained some sort of prize (?) for his endeavors. The only thing I have to show that I was there is one picture which is unfit for publication sent me by Ken Lord. We all agreed that reunions are great things to attend and resolved to be at the next one. The committee planned things to perfection and I wish at this time to express my appreciation of their efforts.

You will notice from my address below, if you read that far, that it has changed since last spring. The urge to the country was too great, and so, if you find a big map, you may find where the large town is located. Anyway, it is near Nyack, N. Y., and is a fine place to live when you get there; but like all New York suburban residences, it is lots of fun getting there.

The letters received last year were fine and I hope you all will overcome the reluctance to write and will drop me a line for all of us to know what your daily life consists of. — BENJAMIN P. RICHARDSON, *Secretary*, Box 384, Congers, N. Y.

#### 1927

#### COURSE II

Last year was a lean one for Course II notes. We will at least attempt a good start this year. Akron, Ohio, contributes the greater part of the news items this time, with the new zeppelin taking the center of the stage. Your Secretary was in Akron the latter part of August to renew old acquaintances and to see the new zeppelin. Tom Knowles, erstwhile magician, but more recently serious-minded zeppelin research worker, assists Jerome C. Hunsaker '12, Vice-President of Goodyear-Zeppelin Corp. Development of airship transportation, study of Atlantic weather conditions, and immediate problems in connection with construction and testing of the *Akron* all take the attention of zeppelin-minded Knowles from time to time.

Also with Goodyear is Gordon McNeil, formerly employed in the mechanical rubber goods division but for the past year and a half assigned to design in connection with zeppelin engines and engine rooms. Strangely, Knowles and McNeil talk zeppelins continually unless forcibly sidetracked from the subject. Designer McNeil, single, has trouble keeping roommates. Knowles, Coffin and lastly Twisty Malmquist '28 have each deserted him in turn; Knowles and Coffin to get married, and Malmquist when he transferred to San Francisco.

Larry Coffin, tire designer and more recently transferred to the Argentine, joined the ever-increasing ranks of the benedictos on August 1, 1931, when Helen Elizabeth Cockrell of Akron, was married to him in Hurlingham, Argentina. Congratulations, Larry. Larry is in charge of tire design at the Argentina plant of Goodyear. In the Argentine also is Hal Hibbard, married, successful, and probably fat. Mary Lois Ruppenthal was married to Hal in Buenos Aires, Argen-

1927 *Continued*

tina on December 20, 1930. Congratulations to you also, Hal, belated as they may be. Tire man and globe trotter Hibbard was transferred from Spain to take charge of truck tire sales in Argentina for Goodyear. — DAVID R. KNOX, *Secretary*, 13505 LaSalle Boulevard, Detroit, Mich.

**1928**

Although this is the first issue of the fall and all you fellows are hungry for news about the Class, I hope you will pardon the brevity of my contribution this month. With pencil in hand and paper perched precariously on an unsteady knee, I am dashing these notes off on a train en route to New York. Tomorrow (August 30) I sail for Europe on a combined business and pleasure trip for three weeks and am taking this, my only opportunity, to set down what information I can remember from news collected during the summer interim.

A letter recently received from Ernie Dodge '27 reveals that the gang in New York, composed of '27 and '28 men, is planning several get-togethers for the coming winter. Any men not familiar with these activities and who desire advance notices of the next meeting are requested to correspond with Ernest Dodge, 24 Walker St., New York City, or Charles Richheimer, 27 West 72d St., New York City.

The second and last meeting of this combined group was held on June 25 and was attended by about 35 fellows. All reports reveal that a most enjoyable dinner and reminiscent buzzing-bee was enjoyed by all. Credit for starting these meetings goes to Deke Crandall '27, Charlie Richheimer, Lov Baker '27, Jim Lyles '27, Red Earl '27, and George Palo.

On July 17, Paul E. (Bus) Rush, XV, joined the ever-increasing ranks of '28 papas. Bus' contribution to the Class baby colony is a daughter, Shirley Ann. Bus is still located with the Goodyear Zeppelin Corporation in Akron and during the recent launching of the *Akron* had the honor of making arrangements for Mrs. Hoover's christening party.

The Class will regret to learn that Bob Mercer, VI, died in New York City on August 3 from pneumonia. To those of us who knew Bob intimately, it is hard to realize that he has gone; for he was one of the strongest and most robust members of the Junior-Varsity crew for three years. To Bob's family, the Class extends its sympathy and condolences.

As I am writing these notes Jim Donovan, X, is probably taking his vows as a benedict. Jim's bride is Miss Frances Cooper-Marshall, Radcliffe '28, and the wedding is being held at St. Paul's Church in Brookline. E. Vernon Lewis is the best man and Ralph Jope the usher. Jim and Mrs. Jim plan to live in Cambridge.

The back of an envelope extricated from my pocket reveals that Nap La-Croix, also of Course X, was married on July 3 to Miss Gertrude Day of Newark, N. J. They are living at 40 South Munn Avenue, Orange, N. J.

A search through my pockets (and memory, too) fails to reveal any more information of Class interest. The November issue will be a different story. — GEORGE I. CHATFIELD, *General Secretary*, 420 Memorial Drive, Cambridge, Mass.

**COURSE I**

Perhaps I may be pardoned if I start with the story of my own summer vacation. My two weeks of liberty came in June and my plans called for a round trip to Cincinnati for a family reunion. I planned my westward trip, however, to include visits to Kent Hough and Bill Tandy and had an extremely enjoyable day with each.

Kent was working on the Safe Harbor dam and living in Lancaster, Pa., at that time. He has since returned to Boston and I don't know just what he is doing now. I reached Lancaster on a Friday evening, sufficiently early for a grand bull session. Hough, as we've reported before, has been in Guatemala for the United Fruit Co., and in Maine working on a hydro job near Bingham. At Lancaster he was once more busy on a hydro job. Safe Harbor will eventually have 10 units of approximately 31,000 K.W. each. The job was about half completed when I was there and, of course, at a very interesting stage for inspection. Hough, at the time was busy on the layout of the power house.

Leaving Lancaster I drove south through the Shenandoah Valley, then turned west across the mountains to Glen Ferris, W. Va., where Tandy has been for a bit more than two years. Bill is working for the New-Kanawha Power Co., which is a subsidiary of the Union Carbon and Carbide Co. His job was on a hydro development which will supply power for the electric furnace of the Carbide Company in Glen Ferris. Bill is in the enviable position of being in close touch with both the design and construction of the development. The job consists of a gravity dam, power tunnel with intermediate surge basin and power house of 5-35,000 K.W. units. The tunnel is the main part of the job. It is 16,000 feet long and 46 feet in diameter for most of its length. Work was being advanced in two sections of 7,000 and 9,000 feet with headings running from each end, and both ways from the surge basin. The 7,000-foot section was holed through early in August. Taking cross-sections in a tunnel of this diameter was a laborious task until Bill devised an instrument which reduced the time for taking each section from 20 minutes to five minutes. This present development will be completed next year, and Bill had already started preliminary studies for a second plant just upstream from this first one. After a very pleasant day, I continued on to Cincinnati where I spent 10 days and then returned to New York with the usual inertia that all vacations seem to produce.

Claude Rice broke into the news on page one this summer. He is working for the Rock Island Railroad, at one time in Missouri, more recently in Iowa. With

two other engineers he was driving a railway motor car over a new section of line they had just completed, and, as will happen, a passenger train was using the same track and going in the opposite direction. The on-coming train was hidden by a curve until it was only 500 feet away. However, with only that distance to go Rice and his companions unceremoniously vacated their car, which continued alone until completely demolished by the ensuing collision. Rice and his friends suffered only cuts and bruises from their none too easy landing on the gravel and cinder ballast. As noted, this section of line is now completed and Rice has been shifted. His new headquarters are Polo, Mo., but his latest letter was from Corydon, Iowa. Address him at Box 275, Polo.

Charlie Cristofalo made a change early this summer and is now working for the Highway Commission of Westchester County. — Bob Cook tells me that Les Senior is no longer with the Board of Transportation, but is working for the State Sanitary Commission. Bob, himself, is still with the Corson Construction Co. — George Mangurian had occasion to be in Troy, N. Y., during the summer. He had once worked for the Highway Commission there, so dropped in to look over his old quarters, and was quite surprised to find Pop Robinson occupying his old desk. This is the first news we have had of Pop since graduation, and we suggest that if he reads this, we'd like to hear more of his adventures from him directly. The same applies to quite a number of others. — GEORGE P. PALO, *Secretary*, 1095 Jerome Avenue, New York City.

**The Technology Club of Cincinnati**

Saturday afternoon, June 20, a round dozen members and their families journeyed from Cincinnati to White Villa, Ky., for the summer outing of the Club. Youngsters were there aplenty and enjoyed themselves immensely with the boating, swimming, and games. Their dads were not far behind them either in entering into the spirit of the occasion, and wondrous was the display of aquatic feats, and keen indeed was the rivalry with the horseshoes. The ladies enjoyed bridge on the verandas of the cozy little clubhouse where later in the day all were united in doing justice to a real Kentucky chicken dinner. The party was arranged and pleasantly managed by President John D. Cochrane, Jr., '23, who was quite successful in making this a very much enjoyed summer afternoon.

The club has again changed the place for holding the noon-day luncheons. As large round tables with nice white table cloths, suitable for architectural sketching and the working of trick math problems, are a prime necessity, not every dining room makes a successful Technology eating place. The Bird of Paradise Room, main lobby of the Hotel Gibson, has now been chosen as properly equipped to meet the demands of our members. The hour is the same, every Tuesday,

12:30 to 2:00 p.m., and Technology men visiting Cincinnati are invited to bring their pencils and sit in. — **WILLIAM V. SCHMIEDEKE**, *Secretary*, The Penker Construction Co., 1030 Summer Street, Cincinnati, Ohio.

### *Technology Association of Northern California*

Changes have been taking place in the M. I. T. Club of Northern California. R. W. Chandler '12, Vice-President of Grayton-Knight Co., called on us early in February and we hurriedly got together about 20 men to meet him at an evening dinner. His enthusiasm and Technology spirit were so contagious that our local organization, which has existed for years but without definite organization and more recently without a full line of officers, also a bank account, suddenly became class conscious and appointed a Committee to draw up a plan of organization.

This committee worked as rapidly as such committees could be expected to, and in the latter part of May we held another evening meeting at which a small group of Alumni definitely organized our present club with officers, a constitution and by-laws, and, most important of all, with a treasury machinery for operating purposes. The officers elected were: President, J. E. Woodbridge '93, local representative of Ford, Bacon and Davis, and the father of the local Technology Club, since he has maintained it in a state of life for many years at considerable expenditures of his personal time, fortune, and effort; Vice-President, John J. Thomas '07, Pacific Coast Manager of the American Can Co., and a newcomer in our midst, bringing with him the worthy ideals of active participation in our club; Secretary, F. G. Harmon '23, Columbia Steel Co.; Assistant Secretary, F. W. McLaren '25, partner in Sempson & McLaren; Treasurer, R. A. Folsom '18, Manager of W. R. Ames & Co.

For the two members at large who, in addition to the above officers constitute the Executive Committee, we have Professor E. A. Hersam '91, of the University of California, and L. Standish Hall '14, Chief Hydrographer, East Bay Municipal Utility District, Oakland, Calif.

The newly organized Club met Dr. Compton on June 24; that is, six members motored down to Salinas, approximately 125 miles from San Francisco, and met Dr. Compton and took him to the Del Monte Hotel, where he was taken around the famous 17-mile Drive on Monterey Peninsula, and where a very pleasant evening was spent. Dr. Compton was introduced at the Pacific Coast Section of the National Electric Light Association Convention which was in progress at the hotel, and later six or eight Technology men enjoyed a very pleasant two hours in his rooms listening to more or less intimate details of happenings at Cambridge. Our first contact with Dr. Compton was inspiring in every way and in keeping with the very impressive reputation which he has developed in Technology circles. Our admiration for him naturally grew during the altogether too short time that he was in San Francisco. Dr. Compton was entertained officially at Stanford University, where he had an opportunity to see several of the interesting technical developments for which Stanford is quite noted. It was necessary for him to speak for approximately two hours to 48 alumni who gathered for the dinner reception to him in San Francisco before they were satisfied to permit him to stop. These men all gained the feeling that his quiet yet keen and forceful manner presages a great future for the Institute under his direction. This was, without doubt, the most pleasant Technology evening that any have experienced in this territory.

Dr. Compton's address before the Commonwealth Club of California was attended by approximately 400 and was broadcast over the local network of radio stations. We have received an endless

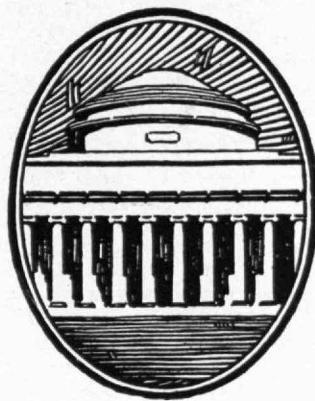
number of favorable comments of congratulation in Dr. Compton's behalf as a result of his appearance before this renowned club. We, ourselves, felt that his address was one of the most timely and interesting that has been presented before that club. He was heartily entertained by the faculty of the University of California, where we know he saw many things in which he was interested, and, incidentally, we understand, robbed them of two of their most promising scientists to add to the staff at Cambridge. Dr. Compton spent Saturday in our midst, following his own personal interests, and he departed for the North, we hope, with a feeling of assurance that in this far-removed district there are men who are loyally interested in the Institution which he heads.

There are 125 of us in the Bay District, a nucleus, we hope, for an active branch of the large body of Alumni of the M. I. T. — **FORREST G. HARMON**, *Secretary*, Columbia Steel Co., Room 1428 Russ Bldg., San Francisco, Calif.

### *M. I. T. Association of Buffalo*

The Spring Meeting of the M. I. T. Association of Buffalo was held at the University Club April 23. The guest speaker of the evening was Samuel B. Botsford, of the Buffalo Chamber of Commerce, who impressed upon us the need of engineering tactics in city administration. We were fortunate in having as our guest, Registrar MacKinnon, who told us how much more difficult it is to graduate from the Institute now than in years gone by.

James B. Brinkerhoff '22 was elected President of the Club and Clayton D. Grover '22, Secretary. A record of Technology men in Buffalo and vicinity is maintained at the Secretary's office for the convenience of any who wish to locate their friends. — **CLAYTON D. GROVER**, '22, *Secretary*, c/o Whitehead Metal Products Company, 319 Niagara Street, Buffalo, N. Y.



# INFORMATION

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The Institute publishes a variety of bulletins, fully descriptive of individual courses, as well as a catalogue of general information essential to the entering student. The Technology Review Bureau will be glad to send, gratis and post free upon request, one or more copies of any publication listed below, or to forward any special inquiry to the proper authority.

*Ask for the following circulars by their descriptive letters:*

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**C:** For announcement of courses offered in Summer Session, ask for Bulletin C.

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**E:** For the reports of the President and of the Treasurer, ask for Bulletin E.

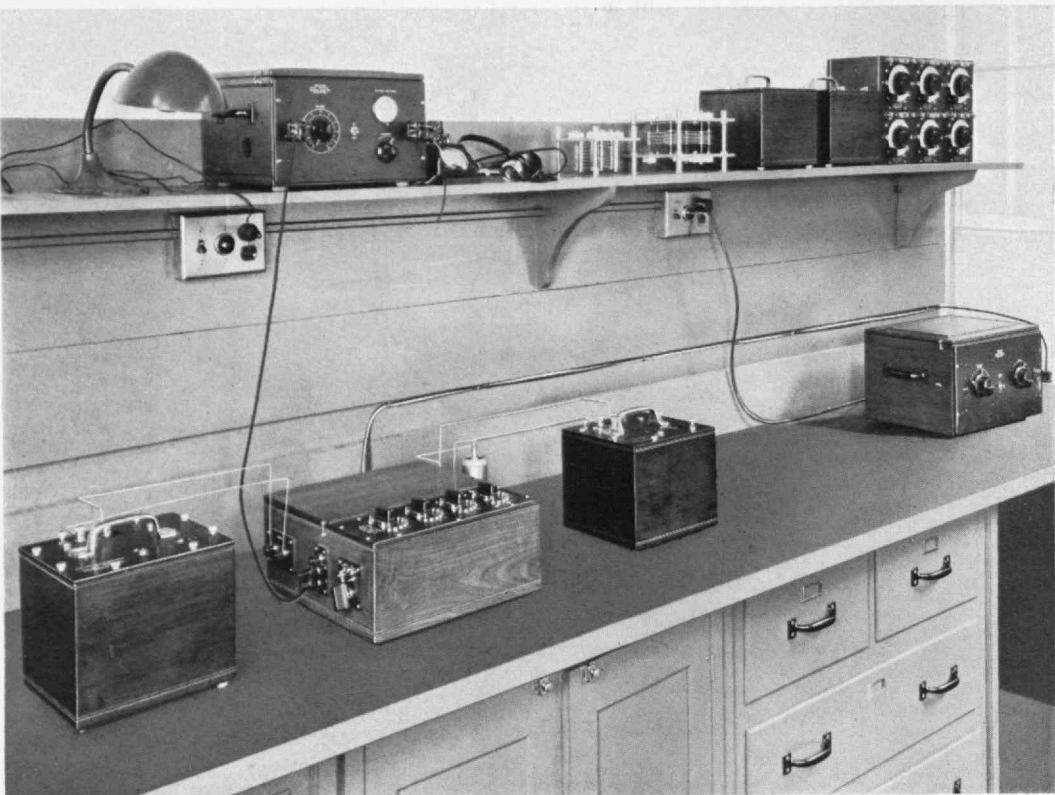
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*All inquiries sent to the address below will receive prompt attention*

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